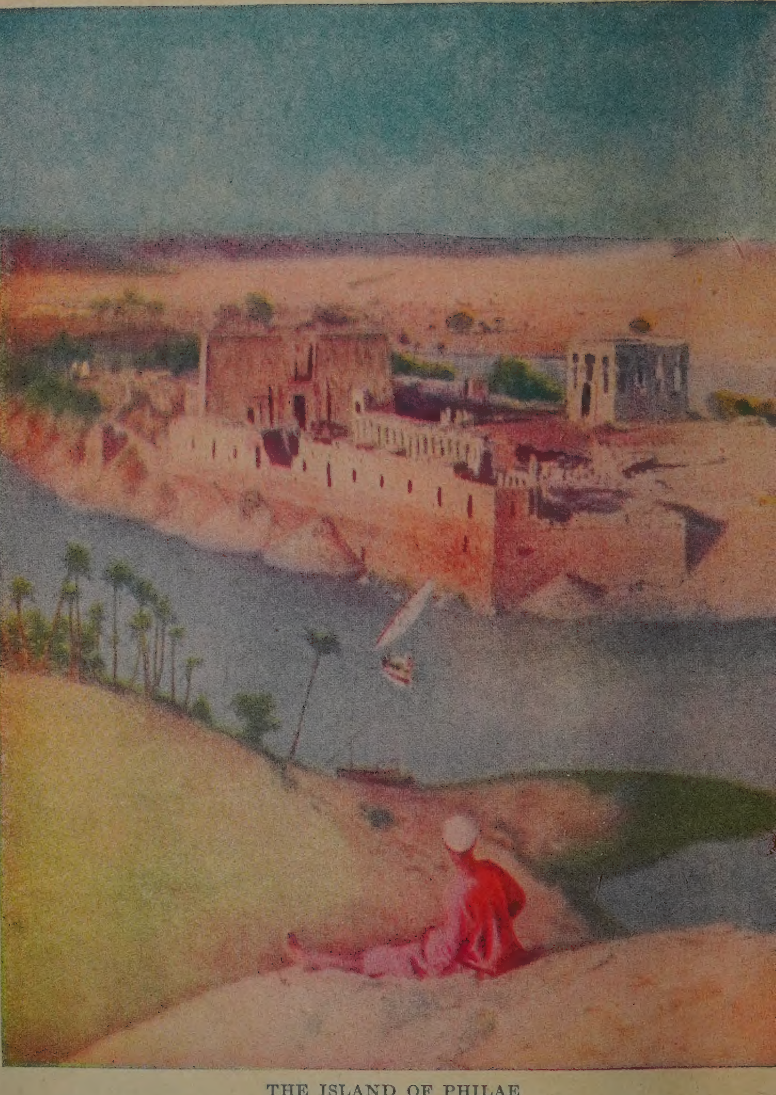
ADAIR'S NEW ENCYCLOPEDIA



THE ISLAND OF PHILAE

Philae is situated at the head of the first cataract of the Nile. The Island is submerged between December and April since the building of the Assouan Dam. During the rest of the year its ruins are accessible to tourists.

ADAIR'S NEW ENCYCLOPEDIA

COMPLETE — CONCISE

A New and Up-to-date Reference Work

FOR

HOME, SCHOOL and OFFICE

IN FIVE VOLUMES
WITH FIFTY FULL PAGE MAPS

VOLUME TWO

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CHOISY, FRANÇOIS TIMOLEON, ABBE DE (1644-1724), Fr. author; famous for his *Memoires*.

CHOKING is caused by obstruction of larynx, (*i.e.*) top of windpipe, frequently due to piece of food; if acute, the mouth should be opened and the forefinger inserted to remove obstruction; if this fails, windpipe must be pierced in order to secure respiration; suffocation often occurs in this way.

CHOLERA, a very fatal disease, the symptoms of which occur in three stages: first, violent vomiting and diarrhæa, with liquid colorless stools and severe cramps; second, collapse, the pulse hardly perceptible, the skin dry and cold, the body of a livid color, while the vomiting and cramps still continue; third, if death does not take place before this, there is a reaction, the pulse is stronger, the temperature rises, the bowels are usually constipated, and the urine scanty. This stage is followed by great weakness, which retards recovery and may even cause a fatal ending. Treatment consists in the administration of weak solution of permanganate of calcium and of keratin-coated pills of permanganate of potassium. Intravenous injections of hypertonic saline solution are given when the blood pressure falls or the sp. gr. of the blood rises. The diet is limited to barley water. Inoculation against cholera, introduced in 1893-4, is now practiced to a considerable extent.

The cause of cholera is a specific organism, the common bacillus or vibrio discovered by Koch. The disease is endemic in the delta of the Ganges, and from time to time, for reasons which have not yet been fully ascertained, it becomes epidemic and is carried in waves, N., W., and E. going as far as Europe on the one hand and America on the other. It appeared in England in 1831-2, causing over 2,500 deaths, and also in the latter year on the Continent, the mortality reaching many thousands. In 1837 it raged throughout Italy (causing 24,000 deaths in Palermo alone), and reached Berlin; while in 1849 it invaded England, London alone having 13,000 deaths from the disease. There was a severe outbreak in the N. of England in 1853, and it again reached London in the autumn of 1854. In 1865 about 50,000 deaths were caused by it in Constantinople and it only declined after the outbreak of the great fire which destroyed the worst parts of the city; cases also appeared in Italy, France, and Spain, and in 1866 in the S. of England, a relief fund being raised in London. In 1883 the disease appeared in Egypt, causing deaths among the Brit. troops, spreading in 1884-5 to France (5,000 deaths), Italy, and Spain (over 91,000 deaths), and in 1886 to Austria and Hungary, while in the same year there were 37,000 deaths in Japan. In 1892 there was a severe outbreak in Persia (60,000 deaths), Russia (260,000 deaths), Rumania, Austria and Hungary, France (3,000 deaths), Spain, Belgium, Hamburg (7,600 deaths), and eastern seaports of England. In 1894 there was another epidemic in Russia, reaching also Austria and Germany. In 1897 there was an outbreak on a P. and O. liner which arrived at Plymouth, causing four deaths, infection being conveyed by fruit from Port Said. In 1908-9 there was a severe epidemic at Petrograd and elsewhere in Russia. Cholera was prevalent in Russia and the countries of central and southeastern Europe during and following the World War.

CHOLET (47° 3′ N., 0° 51′ W.), town, department Maine-et-Loire, France; manufacture of linen, woolen fabrics, chief industry. Pop. 15,000.

CHOLON (10° 40′ N., 106° 30′ E.), town, Fr. Indo-China; commercial center; extensive rice trade. Pop. 40,000.

CHOLONES, S. Amer. Indian tribe inhabiting the Amazon valley.

CHOLULA (19° 2′ N., 98° 14′ W.), ancient town, Puebla, Mexico; has remarkable pyramidal temple, covering area of about 45 acres, dedicated to god Quetzalcoatl. Pop. 7,000.

CHOPIN, FRÉDÉRIC FRANÇOIS (1810-49), Polish composer and pianist; *b.* near Warsaw; settled in Paris, 1831; of delicate health and highly nervous nature; formed intimate relations with George Sand, and friendships with Heine, Berlioz, Liszt, and other famous contemporaries; most works for pianoforte; original poetic style of great lyric beauty, with marked Polish characteristics; sonatas, ballads, études, nocturnes, preludes, polonaises, valses, etc.

CHORALE, Ger. hymn-tune.

CHOREA, ST. VITUS'S DANCE, nervous disorder occurring most commonly in children, characterized by irregular jerking movements of the muscles of the limbs and trunk, usually most marked in the fingers and toes; the child seems very restless and makes grimaces. The cause of chorea is now believed to be a micro-organism, the diplococcus of rheumatism, and other manifestations of rheumatism may be present in the condition, (*e.g.*) pericarditis, arthritis, tonsilitis. The treatment is rest, both physical and mental, a light, nutritious diet, plenty of fresh air. The salicylates are administered, as in rheumatism with success; bromide of potassium and chloral are useful sedative drugs in this condition, arsenic is a most valuable tonic, while massage and electricity are employed with benefit.

CHORIAMB, a metrical foot of four syllables, two short between two long, *viz.* — oo —.

CHORLEY (53° 38′ N., 2° 38′ W.), market town, Lancashire, England; cotton manufactures, coal mines. Pop. 1921, 30,576.

CHORUS, a band of people singing together, or a composition that is sung by a number of people together. In ancient Gk. drama the chorus consisted of a number of people on the stage who either explained the action of the play, or commented on the events portrayed. Sometimes the chorus addressed, and was addressed by, the actors.

CHOSE IN ACTION, Eng. legal term, designating the right to sue for damages, legacies, copyrights, etc.

CHOSEN, Korea (*q.v.*).

CHOSROES I., king of Persia (531-579); went to war with the Rom. Empire, then under Justinian; a wise ruler, tolerant of Christianity though himself Zoroastrian.

CHOSROES II., king of Persia (590-628); at first successful, but afterwards defeated by the Romans under Heraclius; great neither as a king nor a man.

CHOTA NAGPUR, CHUTIA NAGPUR (*c.* 24° N., 48° E.), division, Bihar and Orissa, India, comprising five Brit. districts and several tributary states; mountainous; forest-covered; rich in minerals; rice, lace, coarse silk; area, 27,101 sq. miles. Pop. 4,900,000.

CHOUANS, Fr. Royalists, who after the Revolution, strove to maintain the Royal cause in Brittany; Cadoudal, the leader, was executed, 1804.

CHRÉTIEN DE TROYES (*c.* 1150), Fr. poet.

CHRISM, oil (generally mixed with balm), used in R.C. Church, after being blessed by a bp. (on Maundy Thursday), for anointing in Baptism, Ordination, etc.

CHRIST, See Christianity.

CHRISTADELPHIANS, or 'Brothers of Christ,' a sect established in the United States about the middle of the nineteenth century by an Englishman, Dr. John Thomas, M.D. He was a seceder from the Disciples of Christ. The Christadelphians hold to primitive Christianity and regard other churches as apostate. They believe the Trinity is not a person but an effluence of divine power; that Christ will yet come again and set up his kingdom in the Holy Land; that the righteous will be rewarded by eternal life and the wicked by eternal death. They practice immersion. The church has no pastors nor elders and is governed on the congregational system. Its numbers are small, under 2,000, and are grouped in about 70 churches scattered over 24 states.

CHRISTCHURCH (50° 44′ N., 1° 47′ W.), town, Hampshire, England, at junction of Avon and Stour; famous for mediæval priory church, and ruins of Norman castle; watch and clock chains. Pop. 1911, 5,000.

CHRISTCHURCH (43° 30′ S., 172° 30° E.), city, Canterbury, New Zealand; bp.'s see; cathedral; government buildings, hospital, museum; active trade in agricultural produce and wool; frozen and tinned meat exported. Pop. 1921, 105,670.

CHRISTIAN II. (1481-1559), king of Denmark, Norway, and Sweden; succ. his *f.* as king of Denmark and Norway, 1513. War broke out with Sweden, and at length C. managed to defeat the Swedes at the battle of *Aepsala* in 1520; he then was crowned king of Sweden, and carried out a treacherous massacre of his opponents.

CHRISTIAN III. (1503-59), king of Denmark and Norway; succ. in 1533. C. was a strong Lutheran, plundered the Catholic Church and enriched the nobles.

CHRISTIAN IV. (1577-1648), king of Denmark and Norway; succ. to the throne, 1588. C. set to work to reorganize the army and navy; went to war with Sweden in 1613, and later with the Empire; was utterly defeated in 1626.

CHRISTIAN V. (1646-99), king of Denmark and Norway.

CHRISTIAN VII. (1749-1808), king of Denmark and Norway; was weak abandoned and became partially insane.

CHRISTIAN VIII. (1786-1848), king of Denmark; succ. Frederick VI., 1839. His short reign was marked by improvements in administration and finance.

CHRISTIAN IX. (1818-1906), king of Denmark; succ. his distant cousin, Frederick VII., as king, 1863.

CHRISTIAN, GEORGE BUSBY, JR. (1873), *b.* in Marion, O. C.E., Pennsylvania Military College, Chester. Pa., 1896, M.A., 1921 In 1896 entered the employ of Norris, Christian Lime & Stone Co., Marion, and advanced to general manager. From 1907 to 1915 he was the general sales manager of the White Sulphur Stone Co., Marion. In 1915 became private secretary to Senator Warren G. Harding and in 1921 to President Harding.

CHRISTIAN CATHOLIC CHURCH, religious community; founded by J. A. Dowie.

CHRISTIAN CONNECTION, Amer. sect, split from Methodist Church, 1793.

CHRISTIAN ENDEAVOR, YOUNG PEOPLE'S SOCIETY OF, an organization of members of the Protestant denominations to promote church activities. It had its origin in the society organized in Portland, Me., in 1881, by the Rev. Francis E. Clark. Since then similar societies have been organized in all parts of the United States and in many foreign countries. The membership in 1922 was estimated at 4,000,000, the local societies numbering about 70,000. The membership is divided into four classes: Junior, Intermediate, Senior societies, and Alumni Councils. Aside from these there are the 'Comrades of the Quiet Hour,' numbering 200,000, who pledge themselves to devote an hour of each day to spiritual contemplation and prayer; the 'Tenth Legion,' with a membership of 60,000, who give one-tenth of their personal incomes to church purposes; and the 'Life Work Recruits,' numbering 6,000, who give their full time to the promotion of church work. The Christian Endeavor Experts, numbering 32,000, are those who have passed examinations and have diplomas showing themselves adepts in all the works of the organization. The extent to which the order has spread into other countries is indicated by the following figures for 1921; the constitution of the organization has been translated into and printed in 60 foreign languages; there are 1020 local societies in Germany, with 32,000 members; 2,000 societies in India, and 1,200 in China, with a proportionate number in Norway, Sweden, Finland, Switzerland and other Protestant countries. While entirely inter-denominational, in the United States the majority of the members are Presbyterians, while in Canada and Australia the Methodists constitute the greater number. The national headquarters of the organization are in Boston, the founder, Francis E. Clark, being President. The official organ is *The Christian Endeavor World*, issued from the Boston office.

CHRISTIAN OF BRUNSWICK (1599-1686), Prot. bp. of Halberstadt; fought in Thirty Years War.

CHRISTIANIA, KRISTIAINA (59°54′ N., 10° 43′ E.), capital, Norway; situated on C. Fjord; seat of Parliament and supreme law courts. Other important buildings are royal palace, univ., citadel, arsenal, town hall, observatory; seat of bishopric; has old cathedral; manufactures woolens, cotton yarns, tobacco, liquors, paper, oil; has fine harbor; exports timber, fish, textiles, matches. Pop. 1920, 258,341.

CHRISTIAN CATHOLIC APOSTOLIC CHURCH in Zion, a religious sect founded by a Scotchman, John Alexander Dowie, at Zion City on Lake Michigan, in Illinois, in 1896. The city named is the denominations headquarters, and contains a college for preachers of the sect, a training school for deaconesses and a number of charitable institutions. The founder also established a tabernacle, a publishing house, a bank and a land association. Zion City was built by Dowie and his followers as a center of the church's numerous activities and he founded a lace industry there. The sect lay stress on faith-healing and decrees abstinence from smoking, drinking, card-playing and the other so-called social vices. In 1906 Dowie was removed from the leadership by his followers on charges of fraud and tyranny. The population of Zion City, which represents the sect's numerical strength, was 5,580 in 1920.

CHRISTIAN REFORMED CHURCH, a religious denomination established in the United States as an outgrowth of successive secessions from the Reformed Dutch church. The first secession began in Holland in the early part of the nineteenth century and a branch of the dissenters was organized in America under the above name. In 1882 the sect's numbers were augmented by further seceders from the Dutch Church on the issue of freemasonry, which the church refused to condemn. A few years later it received further accessions from the True Reformed Church, another seceding body from the parent church. The tenets of the Christian Reformed Church are the same as other reformed churches of Dutch origin. Its congregations are centered in thirteen states, all northern or western and chiefly in Michigan, Illinois and Iowa. The Dutch, German and English languages are used at the services, with a growing tendency of the last named to displace the others. The sect's communicants number about 30,000 and its churches about 160.

CHRISTIANITY, the religion professed by the followers of Jesus Christ. It has more adherents than any other single faith, though less than half the world is Christian. Christianity is an *historical* religion (for this and other points, see below, *Church History*), and like some other great religions, looks back to an historic founder. Externally it belongs to the same group as Judaism, from which it sprang, and Mohammedanism, an offshoot, partly Jewish, partly Christian in origin, with other elements besides. It is therefore a monotheistic faith, but differs from other forms of monotheism in the supreme place in which it places its Founder. Though Christological controversies have rent the Church and are not yet settled, the Church has felt her Lord to be more than human, though its claim to Deity has been denied by Monarchians and Unitarians. Then the question of the relation of the Son to the Father arises, and the doctrine of the Trinity tries to solve the problem.

That Christ is in some sense our Savior is generally held, though the Atonement seems to be capable of endless restatement. Belief in future reward and punishment is likewise found in all forms of Christian theology. Baptism and the Eucharist are almost universal, but about other matters there is endless divergence. But there are certain clearly marked types of Christianity. (1) *Catholicism*, reaching its most developed form in the R.C. Church. The Gr. and Eastern Churches, though in some ways different, largely resemble the Roman and Anglican Churches. The claim of the latter to Catholicity is denied by Rome; it approaches in government and practice the Roman and Gr. Churches, but its theology is more Prot. Catholicism is sacredotal and sacramental, making essential the preservation of the threefold order (bishops. priests, and deacons), and making Baptism and the Eucharist generally essential to salvation, though the Roman Church recognizes seven sacraments. For Catholics the ultimate authority is the Church, the mind of which is expressed in the decrees of its councils. Greeks and Anglicans recognize only the undivided Church, while the Roman Church accepts later councils (*e.g.*) Council of Trent, 1565, and the Vatican Council of 1870, which are binding and accept the infallibility of the Pope.

(2) *Protestantism* was based originally on the doctrine of the sufficiency of Scriptures, but the doctrinal position of Protestants now varies greatly, and there is considerable latitude in Biblical criticism, etc. A recent phenomenon in theo. is what is called 'Liberalism' (*i.e.*) the laying of great emphasis on freedom and development of thought, and on the ethicaliside of religion rather than on doctrine, government, or sacrament. Though this is largely Prot. in origin it has in 'Modernism sprung up in the R.C. Church. Prot. Church government is either Presbyterian (*i.e.*) government by elders—or independent; each congregation is autonomous (*i.e.*) governed from below, not, as in Catholicism from above.

Christianity claims to be universal (*i.e.*) it can and should be adopted by all men at all times and under all conditions. It also claims to be an absolute religion, that is, a final and supreme revelation of eternal truth, and to be supernatural in that it reveals things beyond our world of sense, though its truths may be only realized by degrees. See *Church History* (below), and RELIGION.

Church History.—To trace completely the history of the Christian Church would be to tell the story of Judaism, to which it owes its birth, of Gr. thought, which has exerted such an influence on Christian theology, and of the various political institutions, particularly the Roman Empire, with which it has come in contact. This can hardly be done, but certain principles of study can be laid down, and its main divisions indicated. The beginning of Christianity lives in the life and work of Jesus Christ and the belief in His Resurrection. Jesus is claimed to be Messiah and to come again to judge the world, hence Christianity was at first eschatological (see ESCHATOLOGY) (*i.e.*) expectant of the end of the world. At first, too, it was entirely Jewish, but the work of St. Paul won the Gentiles equal rights in the Church. Meanwhile Christianity was but one of a welter of rites, cults, and philosophies competing for influence in the Roman Empire—an empire compounded of Roman government and Gr. culture. Christians moved in the same spheres of thought as they lived in the same cities as other men, hence there are parallels between the Christian and other religions, and some direct borrowing on each side. Herein lies the importance of Comparative Religion for Christian origins.

Several tendencies were now at work: (1) Greater systematizing of dogma, culminating in the Great Councils of the Church, especially Nicæa (A.D. 325), and Chalcedon (A.D. 461), definition generally resulting from the crystallizing of inherited belief. Most of the early controversies turned on the person and work of Christ. (2) The centralizing of Church authority, first in the monarchical episcopate reached in early 2nd cent., then in the power of the great patriarchates, culminating in the supreme authority gained in the West by the See of Rome. (3) With the development of dogma and Church government came that of ritual, worship, and (generally) of eccles. life. Besides internal development, the first three centuries of Christianity saw bitter and frequent conflicts with the state. By the conversion of Constantine and the recognition of Christianity as the state religion of the Roman Empire, the Church had won, and now had the still mightier task of winning to real allegiance to Christ those who acknowledged her sway. While the Church was persecuted there was no inducement to profess Christianity; with her triumph came nominal conversions. After the onslaught of the barbarians and the collapse of the W. Empire the Church set herself to the task of civilizing and converting them. Though her work was noble it must never be forgotten that whole tribes were baptized en masse, and thus their Christianity was superficial.

The Middle Ages saw Catholicism dominant not only in religion but in politics, and from the 11th to the 13th century the Papacy wielded enormous power. The growth of the monastic and mendicant orders is likewise most important during this period.

In the 15th and 16th centuries came the Renaissance, when there arose a split (seemingly final) in Western Christendom. Theological questions were mingled with political till the 17th cent., but the 18th was anti-religious. Thus the Fr. Revolution endeavored to sweep away Christianity, which was identified with the *ancien regime.*

The 19th cent. saw most important movements in Christian history; science and the growth of historical criticism questioned old positions, yet there were frequent outbursts of religious life—(*e.g.*,) the Oxford Movement, the Salvation Army, Christian Science. The 20th cent. with the deeper understanding both of past history and of religious psychology, will probably have no less important results.

Christianity existed outside the Roman Empire. Recent research has shown how widespread was the Nestorian Church in Asia till crushed by Islam, and Oriental Churches still survive. The Gr. Churches have remained little changed since the 6th cent., and the Russian Church has been formed on their model. But Asia and Africa have never been thoroughly Christianized.

CHRISTIANSAND (58° 8′ N., 7° 55′ E.), seaport, on fjord of Skagerrack, S. Norway; timber, fish. Pop. 1920, 16,543.

CHRISTIAN SCIENCE, a religious denomination based on the teachings of Mrs. Mary Baker Eddy, founder of the Church of Christ, Scientist, from which has spread branches in all Protestant countries of the world, but more especially in the United States. The theology of Christian Science defines God as 'incorporeal, divine, supreme, infinite Mind, Spirit, Soul, Principle, Life, Truth, Love.' It affirms the divine personality of God, but denies his individuality in a human sense. Every Christian Science convert, says Mrs. Eddy 'must begin by reckoning God as the divine Principle of all that really is.' All that may be made the subject of thought, unless it expresses His Being, is illusive, unreal. Therefore the main effort should be to purify thought. Jesus is recognized as the man, who, as the Christ, was the 'divine manifestation of God, who was sent to this earth to destroy incarnate error.' Sin is wrong thinking, which results in a disturbance of the divine harmony. It is at this point that the theology of the sect approaches the aspect in which it has been regarded with most interest; its powers of healing. Christian Science, as supposed by many, does not deny the existence of sickness or disease, but if it recognizes it as a fact, it is only as a manifestation of wrong thought. As wrong thought, disturbing the divine harmony, may cause moral evil, resulting in unhappiness, so wrong thinking may produce a similar condition in the physical sense, disturbing the harmony of the body, resulting in sickness. The cure is to remove the cause of error; to regain harmony by right thinking. This is but stating in theological terms the fact which is accepted by many modern psychologists and medical men; that bodily disorders may be caused by a disturbance of the equilibrium of the subconscious mind, brought about by unconscious suggestion, the cure of which is conscious autosuggestion. Most medical men limit these disorders to those that are classed as 'functional,' and within the limits thus set do not deny the efficacy of Christian Science healers to bring relief. The same results may be achieved, however, by the patient's own unaided efforts, through conscious auto-suggestion. This aspect of Christian Science, therefore, is not original with Mrs. Eddy, and was practiced by the pagan priests of the Greeks, notably by means of the 'temple sleep' and later by the Christian churches of the middle ages, by means of the relics of saints, etc. Established in 1879, in Boston, the 'Mother Church' of Mrs. Eddy has since developed into a world-wide organization of over 2,000 congregations, of which a fourth are in foreign countries. The Mother Church and its branches are governed by a board of directors, originally appointed by Mrs. Eddy, but the local congregations are largely self-governing, being bound only by the tenets of the creeds as set forth in the books written by Mrs. Eddy and published by the board of directors in Boston. The many publications of the church are issued through the Christian Science Publishing Co., which in 1908 founded The Christian Science Monitor, a daily newspaper, now one of the most influential in the country. In 1919 there was an attempt on the part of the trustees of the publishing company to secede from the main organization and function independently, resulting in a law suit, but in 1921 the Supreme Judicial Court of Massachusetts decided this case in favor of the Church. By many it was believed that after the death of Mrs. Eddy, in 1910, there would be a decline in the membership of the sect, but quite the contrary has been the result. In 1922 notable growth was reported, especially in foreign countries, and more especially in Germany, where the government ban on Christian Scientist churches had been removed.

CHRISTIAN UNION CHURCHES, a religious sect produced by the Civil War, known officially as the Independent Churches of Christ in Christian Union. It was formed in 1863-4 by seceders from five denominations, who based its tenets on opposition to war and the ventilation of politics from the pulpit. One of its founders, Rev. James F. Given, left the Methodist Church in 1860 because the Civil War was advocated from its pulpits. With others he drew round him he organized the Christian Union Churches and affirmed its principles as based on Christ as the only head of the Church; on the Bible as the only rule of faith and practice; and on good works as the only test of fellowship. Each of its churches is self-governed, and political preaching is forbidden. Its doctrines are evangelical. The membership numbers about 20,000, with more than 300 churches. The sect's chief centers are in Ohio and Missouri.

CHRISTIANS, BIBLE. See BIBLE, CHRISTIANS.

CHRISTIANSUND (63° 10′ N., 7° 45′ E.), seaport, Romsdal County, N. W. coast of Norway; exports wood, fish products and butter. Pop. 1920, 15,183.

CHRISTIE, RICHARD COPLEY (1830-1901), Eng. scholar; wrote *Etinne Dolet, the Martyr of the Renaissance*, 1880.

CHRISTINA (1626-89), queen of Sweden, dau. of Gustavus Adolphus; succ., 1632, and took the reins of government herself in 1644; was able and brilliant, but self-willed; quarreled with her chancellor, Oxenstjerna. In 1654 she abdicated, joining later the R.C. Church; *d.* in obscurity in Rome.

CHRISTINA, MARIA CHRISTINA HENRIETTA DESIRÉE FÉLICITÉ RÉNIÈRE (1858), queen-mother of Spain; *nee* Archduchess of Austria; *m.* late King Alphonso XII., 1879; regent for her *s.*, Alphonso XIII., until 1902.

CHRISTISON, SIR ROBERT, BART. (1797-1882), Scot. physician, toxicologist, and medical jurist; prof. of Forensic Med., 1822, of Med. and Clinical Med., 1832, in Edinburgh Univ.; made important researches in toxicology and pathology.

CHRISTMAS ('Christ-Mass').—The festival of the birthday of Jesus Christ was at first closely connected with the Epiphany, celebrated on Jan. 6. The observance of Dec. 25 only dates from IV. cent. and is due to assimilation with the Mithraic festival of the birthday of the sun. Dec. 25 was, too, according to Bede, a pagan festival in ancient Britain. The real day of Christ's birth is unknown. Owing to this, its observance was condemned by the Puritans, New Year's Day being celebrated instead in Scotland today.

CHRISTMAS ISLAND (10° 31′ S., 105° 33′ E.), island, Ind. Ocean, S.W. of Java; dependency of Straits Settlements.

CHRISTOPHE, HENRI (1767-1820), a negro king of Haiti. Originally a slave of Grenada, he became a chief under Dessalines, Emperor of Haiti. After the latter's murder he established himself as king of the North. Civil war followed, but he was declared king in 1810. His cruelty caused a revolt, and to escape imprisonment he shot himself.

CHRISTOPHER, ST., commemorated in the West on July 25, was martyred in the Decian persecution, *c.* 250 A.D.; many legends about him.

CHRISTOPOULOS, ANTHANASIOS (1772-1847), Gk. lyric poet.

CHRIST'S HOSPITAL, the *Blue-Coat School*, founded by Edward VI.; transferred to Horsham, 1902.

CHRISTY, HENRY (1810-65), Eng. archæologist and ethnologist; traveled extensively in Europe and N. America, where he made many discoveries and got together a very fine archæological collection, now in Brit. Museum.

CHRISTY, HOWARD CHANDLER (1873), an American illustrator, *b.* in Morgan county, Ohio. He came east in 1893, and has ever since then been connected with various illustrated periodicals. During the Spanish-American War, in 1899, he went to Cuba with the 'Rough Riders,' and saw the fighting before Santiago, his letters and illustrations during this experience being published in Scribner's Magazine, Harper's Weekly and Collier's Weekly. Since 1910 he has specialized in illustrating serials in monthly magazines. He has also illustrated three books by James Whitcomb Riley and three of his own. Since 1920 he has also done portrait painting.

CHROMATIC SCALE, musical term for a scale in semitones.

CHROMIC ACID (H_2CrO_4), an acid formed like sulphuric acid from a trioxide (CrO_3); forms Chromates with the formula K_2CrO_4. Other salts are known as Bichromates and Trichromates according as the combining metal has one or two additional molecules of the trioxide; thus a bichromate would be XCr_2O_7.

CHROMITE, CHROMIC-IRON ORE ($FeCr_2O_4$), iron-black mineral, occurring in compact or granular masses or as octahedral crystals in the Urals, New Zealand, U.S.A., and Unst. It is the chief source of chromium and its compounds.

CHROMIUM ($Cr=52$), metallic element, occurring only in combination, chiefly as chromite (Cr_2O_3FeO), chromeochre (Cr_2O_3), crocoisite ($PbCrO_4$), and a few other minerals. Many of its compounds have striking colors, and are used in dyeing, etc. Its principal use is as a constituent of chromium steel. According to the valence of its molecules it forms salts termed chromous, chromic, chromates, and dichromates.

CHROMOSPHERE, reddish gaseous layer outside the photosphere of the sun, shown by the spectroscope to consist of incandescent hydrogen and helium. It is particularly visible during a total eclipse. A corresponding layer round stars is also termed C.

CHRONICLE, hist. record, often compiled by several hands. The early Christian C. were written in Gk. and Latin. The Anglo-Saxon C. was commenced in King Alfred's reign and ended in Stephen's.

CHRONICLES, BOOK OF, in Eng. Bible follows 1 and 2 Kings, but in the Hebrew Canon comes with Ezra and Nehemiah 'last of all.' These three form one work covering the whole history from Adam to 432 B.C. Chronicles thus covers the same ground as Genesis to Kings, from which there are considerable extracts, but much is missed out, (*e.g.*) the patriarchal history is given very shortly, and the later history of the kingdom of Israel, as distinct from Judah, is omitted.

The date of C. is probably *c.* 330 B.C., and the author very likely a Levite. Additions—genealogies, etc.— are described as being from the 'Book of the Kings of Judah and Israel', etc. The historicity is not so sure as that of Kings, for the writer of C. looks at the early monarchy from the standpoint of a later age. The literary style is late and peculiar.

CHRONOLOGY, science that treats of time, and is concerned with arrangement of historical events in order of time and determining the intervals between them. It is necessarily based on method of measuring or computing time by regular divisions or periods, according to the revolutions of the earth or moon. (See TIME.) As there can be no exact computation of time or placing of events without a fixed starting-point, dates are in every case referred to some arbitrary point or epoch, which forms the beginning of an era. Most epochs are selected on account of some notable event which occurred, or was supposed to have occurred, at the time in question. Thus the Jews reckoned time from the creation, which they dated at 3760 B.C. The creation has been the starting-point of many chronologies, but among Christians the birth of Christ is now generally adopted, dates before that event being denoted by the letters B.C. (Before Christ), and dates after that event by the letters A.D. (Anno Domini, or In the year of the Lord), which are often omitted.

The method of computing from the time of the birth of Christ was first introduced in the VI. cent. A.D., and was adopted generally in Christian countries by the year 1000 A.D. It is not certain that the birth of Christ took place at the usually accepted date; it is believed by some to have occurred perhaps four years earlier. The only epoch with an astronomical basis is the Julian epoch, 4713 B.C., based on the coincidence of the solar, lunar, and indicational periods. The *indicational period* is a period or cycle of fifteen years, relating to some judicial acts, probably the publication of tariffs of the taxes which took place at stated intervals. The Cæsarian indication fell on the 8th day before the kalends of October, or September 24.

The paucity of ancient records of contemporary events renders the construction of accurate chronologies of ancient times extremely difficult, if not altogether impossible; but modern archæological research has already considerably modified the opinions of a decade ago, and is gradually leading to definite outlines of the history of the nations of whom any records have been preserved. Thus it is now fairly certain that the historical period of such nations as the Egyptians and Babylonians was at least 5000 years B.C., and there is evidence of a high state of civilization in Mesopotamia at least 7000 years B. C. Increased knowledge of Assyrian and Babylonian records has led to the rejection of some accounts hitherto regarded as authentic.

Several epochs have been already mentioned; others are met with among various nations. Ussher, Bossuet, and others dated the creation at 4004 B.C. The *Era of Constantinople*, adopted in Russia, dates from the creation, fixed at 5508 B.C. Among the Greeks, the Olympic games, which occurred every fourth year, served as a basis, each group of four years being an Olympiad; the starting-point was the year in which Corœbus was victor in the Olympic games—776 B.C.

The Romans started their chronology from the date of the supposed founding of their city (*Ab Urbe Condita*, A.U.C), April 21, in the 3rd year of the 6th Olympiad, *i.e.* 753 B.C.

The *Mohammedan Era*, or *Era of the Hegira*, in common use among the Mohammedan nations, dates from the *Hegira*, or flight, of Mohammed from Mecca to Medina, July 16, 622 A.D.

The most important eras of Hindu chronology in use at present time are the *Kaliyuga*, an astronomical era reckoning from 3102 B.C., but only founded, by astronomers, early in V. cent. A.D.; the *Saka* era, a hist. era which dates from 78 A.D., and is in use in S. India; and the *Vikramaditya*, founded 58 B.C., the hist. reckoning used in N. India. There are also two religious eras, which reckon from the supposed deaths of the respective founders of religions—the Jain era, reckoning from 528 B.C., and the Buddhist from 544 B.C.

The Persian era or *Era of Yazdegerd* starts at the accession of Yazdegerd III., June 16, 632 A.D. The Chinese reckon time in cycles of 60 years, but do not number the years in any one cycle. Each cycle is divided into two subordinate cycles of 10 and 12 years respectively, each year of each subordinate cycle having a definite name. By combining the names for any particular year in each cycle different names are obtained for each year of the major cycle. The starting-point of the first cycle is usually taken as 2277 B.C.

CHRONOMETER See Watches.

CHROTTA, probably the oldest of European stringed musical instruments; supposed to be identical with the 'crwth' or 'crowd.'

CHRUDIM (49° 58′ N., 15° 47′ E.), town, Bohemia, Austria; sugar, beer, cloth; horse markets. Pop. 13,200.

CHRYSANTHEMUM (*C. sinense*), popular garden plant of the order Compositæ, with beautiful flowers, cultivated in many varieties, such as the Jap., Chin., and pompom kinds, with many shades of color and different habit. It was introduced into Europe from China in the XVIII. cent.

CHRYSENE ($C_{18}H_{12}$), coal-tar product, crystallizing in colorless plates or octahedra, which show a violet fluorescence. M.P. 250°.

CHRYSIPPUS (280-*c* 206 B.C.), Stoic philosopher; *b.* Cilicia.

CHRYSOBERYL ($BeAl_2O_4$), hard yellow or green gem-stone, found chiefly in Brazil, U.S.A., and Ceylon. A cloudy opalescent variety is known as cymophane, and when cut is a valuable 'cat's-eye.'

CHRYSOCOLLA ($CuSiO_3\,2H_2O$), bluish green mineral of opal-, emerald-like or earthy texture, occurring as encrustations, or masses in the upper parts of copper-ore veins, from which it is derived.

CHRYSOLITE, a yellowish gemstone, being a transparent variety of olivine. Darker green stones are called Peridote.

CHRYSOPRASE, apple-green variety of chalcedony, used in jewelry; found in Silicia, the Urals, India, and U.S.A.

CHRYSOSTOM (345-407), generally called St. John C.—one of the greatest Gk. Fathers, baptized *c.* 369; lived some time the life of a recluse; was deacon and priest at Antioch; bp. of Constantinople, 398, but exiled, 404; wrote *De Sacerdotio*, a treatise on the priesthood, and many *Homilies* on books of the Bible; belonged to the Antiochene school; called C. or Golden Mouthed because of oratorical gifts.

CHUB (*Leuciscus cephalus*), freshwater fish of the family *Cyprinidoe*; other fish of the same family are given this name in America.

CHUBB, CHARLES (*d.* 1845), Eng. locksmith, made improvements on 'detector' locks patented by his bro., Jeremiah Chubb, and invented burglar- and fire-proof safes. Further improvements were made on his locks, etc., by his *s.*, John Chubb, 1816-72.

CHUBUT (*c.* 44° S., 67° W.), territory, S. Argentine Republic, between Atlantic and Andes; area, 93,427. Pop. 1921, 28,813.

CHUDE, Russ. name for Esthonian tribes in Siberia.

CHUGUYEV, CHUGUIEV, town of strategic importance in Kharkov, Russia. Pop. 12,000.

CHULALONGKORN (1853-1910), king of Siam; succ., 1868; abolished slavery; developed education and the study of med.; introduced social improvements; visited England, 1897.

CHUMBI VALLEY (27° N., 88° 30′ E.), valley, Chola range, Himalayas, leading from Sikkim eastwards into Tibet.

CHUNAR CHUNARGHUR (25° 5′ N., 82° 55′ E.), town, on Ganges, Mirzapur, United Provinces, India; ceded to Britain, 1768. Pop. 10,000.

CHUNCHO, tribe of warlike S. Amer. Indians occupying a forest tract in central Peru.

CHUNGKING (29° 38′ N., 107° 2′ E.), river port, at junction of Kialing and Yangtse-kiang, China; commercial center. Pop. 1,012,000.

CHUPATTY, Hindu unleavened bread. These cakes were passed from hand to hand among natives before outbreak of Indian Mutiny, and are said to indicate dissatisfaction.

CHUQUISACA (*c.* 20° S., 62° W.), department, S.E. Bolivia, S. America; agriculture, stock-raising, silver mines; area, 26,400 sq. miles. Pop. 333,000. The capital, Sucre, was called C. till Declaration of Independence. Pop. 30,000.

CHURCH SEE CHRISTIANITY.

CHURCH, FREDERICK EDWIN (1826-1900), was *b.* at Hartford, Conn. His earliest paintings were views of the Catskill Mountains, which attracted much favorable attention. In 1855 he visited South America and painted some of the finest scenery there. His painting *View of Niagara Falls from the Canadian Shore* is generally considered to be the best painting of the cataract.

CHURCH, FREDERICK STUART (1842), artist, was *b.* at Grand Rapids, Mich., and educated in the public schools. For some years he was in the employ of the American Express Company in Chicago, and during the Civil War served as private for more than three years. He afterwards studied at the Chicago Academy of Design and later at the National Academy of Design and the Art Students' League, in New York. He has exhibited at various galleries in Europe and America.

CHURCH, GEORGE EARL (1835-1910), Amer. geographer; explored the Amazon, 1868-79, and became prominent authority on geography of S. and Central America.

CHURCH, RICHARD WILLIAM (1815-90), Anglican ecclesiastic; ed. Oxford; fellow of Oriel, 1836; dean of St. Paul's, 1869, where he reorganized the cathedral and became one of the most prominent men in the church; wrote several works on religious and literary subjects.

CHURCH, SAMUEL HARDEN (1858), *b.* in Cauldville co., Mo. Litt.D., Western University of Pa., 1895; A.M., Bethany, 1896; Yale, 1897; and LL.D., University of Pittsburgh, 1909. Was a colonel on the staff of Governor Hoadly, of Ohio, and was presented with a sword by the Governor and the staff for his conduct in handling the troops for the suppression of riots in Cincinnati, 1884. From 1896 was Republican speaker in National campaigns in various parts of the United States and in 1904 was delegate Republican National Convention. Held many important positions including: Supt. of Transportation and later Secretary of the Pennsylvania Lines West of Pittsburgh; Vice President of the Union Steel Casting Co., President of the Carnegie Institute, Pittsburgh, Pa., and trustee of the Carnegie Corporation of New York. Author: *Oliver Cromwell, a History*, 1894; *John Marmaduke*, 1897; *Beowulf* (poem), 1901; *Corporate History of the Pennsylvania Railroad Lines West of Pittsburgh*, 15 volumes, 1898-1920; *Penruddock of the White Lambs*, 1907; *A Short History of Pittsburgh*, 1908; and *The American Verdict on the War*, in 1915. He also contributed to various magazines and wrote two plays: *The Brayton Episode* and *The Two Mrs. Lorings*.

CHURCH, WILLIAM CONANT (1835-1917), editor, was *b.* at Rochester, N. Y., and educated at Boston Latin School. While still a youth he was engaged with his father in printing and publishing the New York Chronicle. In 1860 he became the publisher of the

New York Sun and later Washington correspondent of the New York Times. In 1863 with his brother, he established the Army and Navy Journal and three years later founded the Galaxy Magazine, conducting it till 1878, when it was absorbed by the Atlantic Monthly. In 1882 he was made government inspector of the Northern Pacific railroad.

CHURCH ARMY, Anglican organization, founded 1882, by Rev. Wilson Carlisle for work in slums and among criminals; workers are working men and women licensed by the bp.; it has labor bureaus.

CHURCH OF THE BRETHREN. See BRETHREN, CHURCH OF THE.

CHURCH RATE, tax for maintenance of parish churches, formerly compulsory in England, but not since 1868.

CHURCHES OF GOD, an American religious sect founded in 1830, in Harrisburg, Pa., by John Winebrenner, a pastor of the German Reformed Church. The Churches of God as a denomination was the outgrowth of a religious revival which produced declarations that sectional divisions of creeds violated the gospels, that Christians belonged to the Church of God, and that the Scriptures should be accepted as furnishing the sole rule of faith and practice. The sect's doctrinal position is therefore evangelical. It has no written creed. It is of Baptist principles in adopting immersion as one of its ordinances. It solemnizes two other rites—the washing of feet and the Lord's Supper. The church holds annual conferences, which are called elderships. Each local church has deacons and elders who constitute the church council with the pastor. The membership, about 30,000, includes many of German origin and descent and has its largest numbers in the states of Pennsylvania, Ohio, Illinois and Indiana. The sect has about 500 churches. It publishes a weekly organ, the Church Advocate.

CHURCHILL (57° 30′ N., 95° W.), river, Saskatchewan, Canada; 925 m. long; flows N.E. through series of lakes; enters Hudson Bay.

CHURCHILL, CHARLES (1731-64), Eng. satirist and clergyman; author of the *Rosciad*, 1861.

CHURCHILL, MARLBOROUGH (1878), an American army officer, *b.* in Andover, Mass. After graduating from Harvard University, in 1900, he entered the army, reaching the rank of brigadier-general in 1918. After the outbreak of the World War he was attached to the French forces in the field as military observer. During the early part of 1917 he was executive officer of the American Military Mission in Paris. In the following year he was acting chief of staff of the American Expeditionary Force Artillery. In June, 1918, he became chief of the Army intelligence bureau, a few months later becoming assistant chief of staff and director of military intelligence. During the peace negotiations in Paris he was attached to the American delegation as military expert.

CHURCHILL, LORD RANDOLPH HENRY SPENCER (1849-95), Brit. statesman; *s.* of 7th Duke of Marlborough; elected M.P. for Woodstock (Conservative), 1874; became prominent as an independent Conservative; became the pioneer of 'Tory democracy'; Sec. of State for India, 1885, in Saliaasbury administration; Chancellor of the Exchequer, 1886, and leader of the House of Commons.

CHURCHILL, RT. HON. WINSTON LEONARD SPENCER (1874), an English statesman. He was educated at Harrow and graduated from the Military Academy at Sandhurst, entering the army in 1895. While on leave of absence during that year he served with the Spanish forces in Cuba, later serving with the British forces in India, Egypt and South Africa. While in South Africa, as a lieutenant of cavalry, during the Boer War, he was also correspondent for the London Morning Post, and was captured by the Boers, but escaped after a few weeks imprisonment. On his return to England he entered politics, being elected to Parliament from Oldham as a Conservative. In 1906 he swung over to the Liberals, on the issue of Free Trade, being elected to Parliament as such from Manchester. From 1906 till 1908 he was Under Secretary of State for the Colonies; president of the Board of Trade, 1908-10, and Home Secretary during 1910-11. In 1911 he became First Lord of the Admiralty, which post he was holding when the World War broke out. In 1915 he resigned on account of disagreement with his associates over the disastrous British expedition to the Gallipoli peninsula, for which he was accused of being mainly responsible. During the following year he went to the front and saw active service in France, but in 1917 he became Minister of Munitions in Lloyd George's coalition cabinet. In the following year he took the post of Secretary of State for War, which he held until 1921, when he became Secretary of State for the Colonies. In the elections of 1922, following the resignation of the coalition cabinet and the rise of the

Bonar Law cabinet into power, he failed to return. He has written a number of books on his earlier experiences, among these being *The River War*, 1899; *From London to Ladysmith, via Pretoria*, 1900; and *My African Journey*, 1908.

CHURCHILL, WINSTON (1871), author, *b.* St. Louis, Mo. He was intended for the Navy, graduating at Annapolis in 1894 and served for a short time on the San Francisco, but abandoned the sea for a literary career. He became an attache of the Army and Naval Journal for a brief period acting as managing editor of the Cosmopolitan Magazine. In 1898 he made his debut as a novelist with The Celebrity. A trilogy of American historical novels followed, beginning, 1899, with *Richard Carvel*, which achieved a great popular success. The novels that followed were *The Crisis*, *The Crossing*, *Coniston*, *Mr. Crewe's Career*, *A Modern Chronicle*, *Inside of the Cup*, *A Far Country*, and *The Dwelling Place of Light*, 1917. He was a member of the New Hampshire Legislature in 1903 and 1905.

CHURCHING OF WOMEN, ceremony for women after child-birth, necessary in Rom. but optional in Anglican Church; service in Prayer Book.

CHURCHWARDEN, lay representative of the parish appointed for certain functions, including collection and charge of offertory, care and upkeep of church buildings, maintenance of order during divine service. In many parishes one is appointed by incumbent and one elected by parishioners.

CHURCHYARD, ground adjoining a church, used for burials; legal difficulties have arisen on rights of burial, as parishioners and incumbents have certain privileges.

CHURL (A.S., *ceorl*), man; a freeman of low rank; after the Conquest became a serf; in modern use, an ill-mannered fellow, a boor.

CHUSAN (30° 15′ N., 122° 30′ E.), island, largest of a group off E. coast of China; rice.

CHUTNEY, Ind. condiment containing sweet fruits, acids, etc.

CHUVASHES, tribe, somewhat resembling the Finns, dwelling in Eastern Russia.

CHYLE, term applied to the partly digested food in the small intestine.

CIBBER, COLLEY (1671-1757), Eng. actor and dramatist; joined Betterton's company at Drury Lane, 1690; made great reputation as Lord Foppington in Vanbrugh's *Relapse*; eventually became associated with management of Drury Lane; prepared numerous selections of Shakespeare's plays; his own plays had also considerable vogue, and include *Love's Last Shift*, *The Careless Husband*, *She Would and She Would Not*. His famous *Apology*, 1740, is of considerable value for its criticism of the contemporary stage, and for sidelights upon persons of eminence.

CIBBER, THEOPHILUS (1703-58), Eng. actor and dramatist; *s.* of the above; famous as actor and manager of Drury Lane and Covent Garden; *d.* by shipwreck.

CIBORIUM, originally the alter-canopy; later the casket hanging therefrom, containing the Eucharistic wafer; subsequently Latin name for drinking vessel.

CICADA, homopterous insects of the family Cicadidæ, with a wide head, stout body, and large clear wings. The males are noted for their shrill call, which is produced by two membranes in the thorax, which are vibrated by powerful muscles. The larvæ live underground, and the life cycle may extend over many years. The c. are abundant in tropical and warm countries.

CICERO, MARCUS TULLIUS (106-43 B.C.), Rom. orator and statesman; *b.* at Arpinum and studied under Molo at Rhodes. C. served under Sulla in the Civil War, 89 B.C. His legal work began in 81 B.C.; in 80 he had the courage to defend S. Roscius, who was accused of parricide at the instance of Sulla's freedman. In 70 he prosecuted Gaius Verres for his oppression of Sicily. From 68 we have the help of his letters for much of the secret history of his times. In 66 he was prætor; in 63 he became consul, and his term of office is famous for his suppression of the Catilinarian conspiracy. By his execution of the Catilinarian conspirators he had incurred the enmity of the democrats, and owing to the scheming of P. Clodius was obliged to go into exile in 58. He returned to Italy next year; opposed Cæsar and was compelled to recant in the *De Provinciis Consularibus*. In 52 he defended Milo for the murder of Clodius. In 50 he beccame gov. of Cilicia, and was annoyed at having to leave Rome, where he suppressed a revolt. He returned to Rome in Jan., 49, at the outbreak of the Civil War; after some hesitation he threw his lot with Pompeius. Seeing further resistance useless, after the battle of Pharsalus he went to Brundisium, and thence to Rome in 47, as Cæsar was anxious to be on friendly terms with him. He was much distressed at the death of his dau., Tullia, in 46. After Cæsar's murder he joined the Republican party, delivering the two Philippics. He was among those proscribed, and was killed near Formiæ on Dec. 7, 43.

CICERO, QUINTUS TULLIUS (120-43 B.C.), was bro. and correspondent of Marcus Tullius C.

CICERONE, person who acts as guide to museums and similar places; derived from the name of Cicero, the famous Rom. orator.

CID, THE (Arabic, *El Seid*, the lord), name of a famous character in Span. history and romance. So much has his story been overgrown with legend that some have doubted whether he ever really existed; but it seems clear the original was Rodrigo Tiaz, *b. c.* 1030, called the *Cid.* He played a prominent part in the struggles of his day, fighting row for Christians, now for the Moslems, but as a freebooter rather than a religious or political leader; *d.* 1099. He has become the theme for a large body of Span. romances from the XI. to the XIX. cent's; subject of Corneille's play.

CIDER, beverage consisting of the fermented juice of apples. The fruit is crushed and the juice run into vats and afterwards put into casks, and stored in a cool place. The best c. is made from a mixture of varieties of apples, and from late apples rather than early.

CIENFUEGOS (22° 11′ N., 80° 33′ W.), seaport, Santa Clara, Cuba; spacious harbor, cathedral, military and government hospitals; commercial center of sugar and tobacco trade. Pop. 35,000.

CIGAR, CIGARETTE. See Tobacco.

CILIA (biol.), hair-like processes on cells which keep up a lashing or vibratory motion, either for the purpose of moving the cell itself, as in the case of many unicellular organisms, or for creating a current in the surrounding fluid, as in the mucous membranes of the respiratory passages.

CILICIA (*c.* 36° 30′ N., 34° E.), old division, S.E. Asia Minor, bordering on Mediterranean; chief rivers, Pyramus, Calycadnus, Sarus; produces grain, wine, timber; chief town, Tarsus; was ruled by native princes; subsequently belonged to Persia; inhabited later by pirates, who were subdued by Pompey, 66 B.C. See Asia Minor.

CILLI ULRICH, COUNT OF (1406-56), ruled Hungary during youth of Ladislaus V.; rich, ambitious, and unscrupulous; assassinated by Laszlo Hunyadi.

CIMABUE, GIOVANNI (1240-1302), Ital. artist; generally credited with having revived the art of painting in Italy after the neglect of the Dark Ages; undoubtedly the founder of the Florentine school, which produced Raphael, Michelangelo, and Da Vinci. His mosaics at Pisa and his frescoes at Florence are world-famous. See Painting.

CIMBRI, Germanic tribe inhabiting peninsula of modern Jutland; among earliest of northern barbarians to come into conflict with Rome; first recorded appearance in history, 113 B.C., when they defeated the Rom. consul at Noreia; they then poured boldly over Rhine, Danube, Ebro, and Alps into Rom. territory until finally crushed by Marius in the battle of the Raudine Plains, 101 B.C.

CIMMERII, a nomadic people, referred to in Homer's *Odyssey*; supposed to live in perpetual darkness.

CIMON (*c.* 507-449 B.C.), Athenian statesman; fought against the Persians at Salamis.

CINCHONA, name for trees of the order *Rubiaceoe*; natives of Western S. America cultivated in India, Ceylon, and East Indies for their bark, which contains alkaloids of great medicinal value, the most important being quinine. Decoctions of the bark have been used for many centuries against malarial fever.

CINCINNATI, a city of Ohio, the county seat of Hamilton co. It ranks second in the state in population and according to the census of 1920 was the sixteenth in the United States. It lies on the north shore of the Ohio river and is directly opposite Covington, Ky., with which it is connected by five bridges. The city covers an area of 35¼ square miles. Cincinnati is an important railroad center and is served by 19 different roads. The Louisville and Nashville has its northern terminus there, and it is an important junction point for the Baltimore and Ohio, the Chesapeake and Ohio, and other railroads, linking up the South with New York, Philadelphia and other eastern and southeastern seaports. It is also a terminus for the railroads carrying the greater part of the trade from the North Central States to the South. Cincinnati has been called the most northern southern city and the most southern northern city in the United States. It was formed by the union of a large number of independent communities or villages each of which had an independent existence. These communities preserve in a degree their individuality and local pride. Cincinnati has a larger proportion of native born inhabitants than any other large city of the United States. About 80 per cent. of the population is native born, and there are many beautiful private and public buildings. These include St. Peter's Cathedral, Rockdale Temple (Jewish), a courthouse, and the Union Central Station. Other imposing structures are a city hall and the government building and custom house. There are nearly 300 church organizations and the city is the seat of a Roman Catholic archbishop and a Protestant Episcopal bishop. The public school system is of unusual excellence and higher education is applied by the University of Cincinnati, and the Ohio Mechanics Institute. In addition there are many academies and professional schools. In the city are 17 public libraries and in the free public library are over 500,000 volumes. The industries of the city are of great importance. There are nearly 3,000 manufacturing establishments. Among the chief industries are the manufacture of machine tools, soap, men and women's clothing, boots and shoes, meat products, furniture, foundry products, wood-working machinery, electrical machinery, musical instruments and chemicals. The city is also an important financial center. There are eight National banks, 33 state banks, and over 220 building and loan associations.

The government of the city is based on a charter adopted November, 1917. It provides for a city council and for a mayor who is more or less independent of the council. The city was named in honor of the Society of Cincinnati and was first settled by white men in 1780. It was incorporated as a city in 1819. The first steamboat which descended from Pittsburgh visited the town in 1811, and the first railroad was opened in 1845. Pop. 1920, 401,158.

CINCINNATI, SOCIETY OF THE, an order organized by officers of the American Revolutionary army in 1783. Their announced purpose in forming the society was to perpetuate their friendship and to raise a fund for relieving the widows and orphans of those who had fallen in the war. The organization was so named because its members, like Cincinnatus, had left the plow for their country's service, and returned to it when the need was over. In other words, the Society contained many patriots, Washington among them, who had relinquished a rural life to take part in the revolution. There was a general society, of which Washington was president, and each state had an organization of its own. Foreigners who had aided the revolution were eligible, and so Lafayette, Steuben and others were accorded membership. Alexander Hamilton succeeded Washington as president of the general society. Few of the state societies lasted and the general society languished. The organization had to endure considerable popular criticism by its creation of hereditary members as applied to foreigners, its opponents regarding it as the beginning of an hereditary aristocratic order. Moreover, it was viewed as a military combination aiming at obtaining all the government offices under the new republic, and the legislatures of several states, as well as a number of revolutionary chiefs who had not been in the army, denounced it as dangerous. Due to the Society of the Cincinnati was the organization in 1789 of the Tammany Society of New York City, which was avowedly formed in opposition to it. In 1893 the organization acquired a new life through the successful efforts of the general society in bringing about a revival of the state societies. The present Cincinnati has a membership of 900. The state societies meet annually and the general body triennially.

CINCINNATI, UNIVERSITY OF, a municipal institution of higher learning, situated in Cincinnati, Ohio. As a university its foundation dates from 1874. It had its beginnings in 1858, when Charles McMicken left the city of Cincinnati $1,000,000 to found and maintain a college, but the funds legally available from this source were not sufficient for the purpose and the city waited until other support was forthcoming. The university is partly supported by the city. Tuition is free to student residents of Cincinnati. The institution as now established, affiliates a number of local educational bodies to consolidate the city's collegiate activities. Its departments include the McMicken College of Liberal Arts; a medical college; a school of nursing and health; a law college; the Cincinnati Observatory; a college of engineering and commerce; a teachers' college; and a graduate school. The buildings are finely situated in the secluded Burnet Woods Park, outside the city. The institution's University Press publishes many memoirs and monographs on literary and scientific subjects in the form of an annual volume of bulletins. In 1922 the university had an endowment fund of $4,134,852, a student roll of 4,245, and a faculty numbering 384 under the presidency of F. C. Hicks.

CINCINNATUS, LUCIUS QUINCTIUS, (*fl.* 458 B.C.), Rom. hero; twice dictator; won a signal victory over the Æquians; famed for simplicity of life.

CINDERELLA, heroine of a fairy-tale, which, with variations, is common to a number of languages. That known in England is a trans. of Perrault's Fr. version.

CINEAS, Thessalian mentor of Pyrrhus, king of Epirus.

CINEMATOGRAPH, the mechanisms with which motion pictures are taken and projected on the screen. The camera was invented by the French photographers, the Lumiere Brothers, shortly before 1895. A photographic film, 1¼ inches wide and 50 feet or more in length, passes from one reel to another, within the mechanism, and in passing is exposed behind the lens, progressing by a series of quick jerks, 16 jerks to the second, the shutter opening and closing with each jerk. Each exposure lasts about one-hundredth part of a second. At each exposure the film moves ¾ of an inch forward. The movement can be quickened or slackened, depending on the quickness of motion to be registered, which may range from the trotting of a horse to the comparatively slower movement of a distant train. The essential point is that a series of still photographs must be taken, instantaneously, each photograph registering a degree of motion. During exposure, however, the film must stand stationary, as continuous movement, no matter how slow, would produce only a blurr. After exposure the films are developed in a dark room by being wound from drum to drum through tanks of ordinary developing and fixing fluids. From the negative film a positive is then taken. Presentation on the screen is then accomplished through the cinematograph proper, which is constructed on the same principle as the camera, with the difference that a powerful light from within projects the figures or scenes on the strip of positive on to the screen. Great skill is required on the part of the operator to prevent the flickering so common to a poor presentation, the turning of the machine by means of a crank being quickened or slackened in harmony with the rate of motion presented. SEE MOVING PICTURES.

CINERARIA, garden plant, allied to *Senecio*, with heart-shaped leaves and white, red, or purple, frequently variegated, flowers in clusters; native of S. Africa.

CINGALESE, natives of Ceylon.

CINGOLI (43° 23′ N., 13° 13′ E.), town, Macerata, Italy; ancient *Cingulum.* Pop. 14,000.

CINNA, LUCIUS CORNELIUS, Rom. patrician; follower of Marius; elected consul, 87 B.C.; killed by mutineers, 84 B.C., when undertaking expedition against Sulla. His dau. Cornelia *m.* Julius Cæsar.

CINNABAR, (HgS), the only important ore of mercury, occurring in reddish masses or in brilliant red rhombohedral crystals of the hexagonal system, chiefly in Spain, Istria (Austria), Serbia, California, Nevada, Peru, Kwei-chow (China). It is used as a pigment (vermilion) for the extraction of mercury.

CINNAMIC ACID, PHENYLACRYLIC ACID ($C_6H_5CHCHCoOH$), compound crystallizing in colorless needles or prisms, M.P. 133°, occurring in Peru and Tolu balsams and storax. It has the physiological effect of increasing the leucocytes in the blood.

CINNAMON, the dried inner bark of the small evergreen tree, *Cinnamomum Zeylanicum*, of a light yellowish brown color, of peculiar aromatic taste and odor; used in cookery as a spice and in med.

CINNAMON STONES, HESSONITE, red-orange variety of garnet found as pebbles in Ceylon.

CINNOLIN ($C_8H_6N_2$), poisonous oily base, crystallizing from ether-white silky needles; M.P. *c.* 24°. The compound is isomeric with phthalazine.

CINQ-MARS, HENRI COIFFIER RUZE D'EFFIAT MARQUIS DE (1620-42), Master of the Horse to Louis XIII.; engaged in an abortive attempt to overthrow Richelieu; was condemned and executed; subject of a novel by A. de Vigny.

CINQUE PORTS, name given to the five ports of Hastings, Romney, Hythe, Dover, and Sandwich; to these Winchelsea and Rye were added, and other small places incorporated, the whole forming a jurisdiction for the defense of the coast of Kent and Sussex. Their first charter was granted by Edward I., and they received various rights; the jurisdiction still survives with modified privileges.

CINTRA (38° 56′ N., 8° 23′ W.), town Portugal, on N. slope of Sierra da C.; pleasant climate; resort of wealthy bourgeoisie of Lisbon; interesting Moorish relics; by 'Convention of Cintra' (1808), France undertook to evacuate Portugal. Pop. 6,000.

CIRCAR, an Indian name for one of the subdivisions of a province, specially applied to those of the Madras presidency, 'the Northern Circars'; they became British, 1823.

CIRCASSIA (*c.* 44° N., 40° E.), district, W. Caucasus; bounded N. by Kuban R., S.W. by Black Sea; now included in Black Sea Territory and Kuban province of Russia. Circassians are noted for beauty, and belong to Mohammedan religion. They were finally subdued by Russia in 1864, when numbers of them emigrated to Turkey.

CIRCE (classical myth.), sorceress who lived on the island of Ææa. Ulysses, in his wanderings, landed there, and she changed some of his companions into pigs. Ulysses, however, persuaded her to remove the spell, after which he stayed with her for a year.

CIRCEO (41° 11′ N., 13° 3′ E.), promontory (1775 ft.), on Tyrrhenian Sea, W. coast, Italy; said to have been abode of Circe; favorite seaside resort in ancient times: Rom. antiquities are to be seen.

CIRCLE, a plane figure enclosed by a curve called the circumference, all the points on which are the same distance from a fixed point within, called the center. The c. is the curve which encloses the largest area within a given perimeter (length of line enclosing the area). The following are some properties of the c.:—

No matter what the size of the c., the ratio of the circumference to the diameter is always the same. This ratio, called ñ, has been calculated to hundreds of decimal places (for methods of calculating ñ, see any book on Advanced Trigonometry); correct to eight decimal places ñ is 3.14159265 . . ., but for all practical purposes the value $\frac{22}{7}$ is sufficiently accurate.

The area of the c. is ñ times the square of the radius (ñr^2), and is found by dividing the c. into a large number of very small triangles, the apex of each being at the center and the base forming a small portion of the circumference.

The c. is divided into 360 degrees (written 360°); two diameters drawn so as to divide the c. into four equal parts will thus make an angle of 90° with each other, and similarly with other angles.

CIRCLEVILLE, a city of Ohio, the county seat of Pickaway co. It is on the Scioto River, and on the Norfolk and Western and other railroads, and on the Ohio and Erie canal, 28 miles S. of Columbus. Its name is taken from a circular mound or earthwork built by some ancient people which forms the site of the city. Its industries include strawboard mills, flour mills, and canneries. There are many churches, graded schools, banks, etc. Pop. 1920, 7,049.

CIRCUIT COURTS, institutions distinguished from ordinary courts in that they travel over a given course, or circuit, holding sessions in different centers at different dates. They were known in England as far back as in the reign of Edward I. In the United States there are two kinds of circuit courts; one included in the judicial system of the Federal Government, the other part of the judicial systems of the separate states. The Federal system divides the United States into nine judicial circuits, each taking in a number of states. In 1891 a new court was established in each circuit, the Circuit Court of Appeals, having only appellate jurisdiction. This was done to relieve the Superior Court of the United States, which was then overburdened with pending cases, and also to facilitate the operation of justice by making it less expensive to produce witnesses, etc. In both respects the establishments of these courts was a success. A circuit Court of Appeals has three judges, its decisions being by majority vote, and two judges constituting a quorum. Its decisions are final in all cases pertaining to diversity of citizenship, patent rights, copyrights, revenue, criminal or admiralty cases, but cases involving constitutional law may be appealed to the Supreme Court.

CIRCULAR NOTE, document addressed by a bank to its foreign agents for payment of money to a person named.

CIRCULATORY SYSTEM. The function of the circulatory system is to convey nourishment by means of the *blood* to all parts of the tissues of the body. The nourishment consists of oxygen and of the nutritive substances derived from the food; the oxygen is obtained from the air through the lungs, and the nutritive substances from the alimentary canal either directly through the blood stream or by the intermediary of the lacteals and the lymphatic system. After having nourished the tissues, the blood becomes impure, and part of the impurities is got rid of by the kidneys (urea and other salts), part by the skin (urea and other salts in smaller amount), and part, before which it must first return to the heart, by the lungs (carbon dioxide), while superfluous water is got rid of by all three modes.

The circulatory system consists of two distinct sets of tubular vessels; one set conveys the blood from the left side of the heart to the tissues of the body, and, after it has given up its nourishment to the tissues, back to the right side of the heart, while the other set conveys the blood from the right side of the heart to the lungs, where it gives up carbon dioxide and obtains oxygen, and then back to the left side of the heart, from which it is conveyed in the first set of blood-vessels again, and so on.

The organs of the circulatory system include the *heart*, the *arteries*, the *veins*, and the *capillaries*.

The *heart* is a cone-shaped, hollow, four-chambered, muscular organ, about the size of the closed fist, which is situated in the central part of the chest, between the two lungs and resting upon the diaphragm, and it acts as the central pump which propels the blood through the blood-vessels. It is completely ensheathed by a double membranous bag, the *pericardium*, which binds it down to the upper surface of the diaphragm.

The upper and posterior chambers of the heart, or the *auricles*, are the receiving chambers for the blood—the *right auricle* receiving the impure blood from the great veins of the body, and the *left auricle* receiving the purified blood from the lungs. Each auricle communicates with the corresponding lower and anterior chamber, or *ventricle*, the propelling chamber for the blood, but there is no communication between the right and left sides of the heart, which is practically a double organ. The *right ventricle* pumps the impure blood to the lungs, where it is purified; and the *left ventricle* pumps the impure blood through the *aorta*, the main arterial blood vessel, to the different parts of the body.

The *arteries*, or tubular blood-vessels which convey the blood from the heart to the tissues, have walls composed of three coats—an outer coat of fibrous tissue with some elastic fibres, a middle coat of muscular fibres, arranged circularly, and an inner coat of elastic fibres, delicate connective tissue, and a smooth internal layer of endothelial cells. The arteries of the body consist of two sets—those which convey the blood to the tissues of the body, termed the arteries of the *systemic circulation*, and those which convey the blood to the lungs, termed the arteries of the *pulmonary circulation*. The main arterial trunk of the systemic circulation is the *aorta*, which commences at the left ventricle, of the heart, passes for a short distance upwards, and then curves downwards through the thorax and down the middle of the posterior wall of the abdomen as far as the level of the fourth lumbar vertebra, giving off important branches in all directions. The main trunk of the pulmonary circulation is the *pulmonary artery*, which conveys 'venous' or impure blood from the heart to the lungs, and commences at the right ventricle of the heart and branches to enter the substance of the two lungs.

The *veins* are the vessels which convey the blood from the tissues back to the heart, and their walls are similar in structure to the walls of arteries, the outer coat being composed of fibrous tissue and elastic fibres, the middle coat, which is much slighter than the corresponding coat of arteries, containing muscular fibres, and the inner coat of elastic fibres, slight connective tissue and an internal layer of endothelial cells. In the interior of veins are found pouch-shaped valves, usually in pairs composed of a fold of the endothelial layer, the purpose of which is to prevent the backward flow of blood in the sluggish blood-stream of the veins. The most important veins of the systemic circulation are the *superior vena cava*, which collects the impure blood from the upper parts of the body, and the *inferior vena cava*, which collects it from the lower parts of the body, both opening into the right auricle of the heart. The chief veins of the pulmonary circulation are the pulmonary veins, four in number, conveying 'arterial' or purified blood from the lungs to the heart, and opening into the left auricle of the heart.

The *capillaries* are vessels of much smaller size which connect the terminations of arteries with the beginnings of veins, and, ramifying amid the tissues and organs of the body, bring the nourishing bloodstream into close relation with the tissues. The walls of the smaller capillaries are formed of a single layer of endothelial cells, while the larger capillaries have an additional investing sheath of connective tissues.

CIRCUMCISION, cutting off the foreskin; practiced by Jews and Mohammedans and by the Christian Abyssinians as a religious rite, as well as more generally today as a hygienic measure. It was practiced in Egypt in very ancient times, and has also been found to be a custom as a preliminary to marriage in aboriginal tribes in different parts of the world.

Feast of the C. held on Jan. 1 in Anglican, R.C., and Eastern Churches was to celebrate the c. of Jesus Christ.

CIRCUS (Latin and Gk. 'ring' or 'circle'), in ancient Rome was a building adapted for chariot-racing; the *Circus Maximus* was the most famous; seats were arranged in tiers, special seats being reserved for persons of dignity. Chariots decked with different colors were raced round the *c.*, valuable horses being used. There were also the *Circus Flaminius* and the *Circus Neronis*; races were held on public festival days.

CIRENCESTER (51° 43′ N., 1° 57′ W.), market town, on Churn, Gloucestershire, England; site of Rom. *Corinium*; church of St. John the Baptist contains numerous ancient brasses, interesting monuments, old glass; has museum of antiquities and Agricultural College; bacon-curing, cutlery. Pop. 8,000.

CISALPINE REPUBLIC. See ITALY.

CISCO, a city of Texas, in Eastland co. It is on the Texas and Pacific and the Texas Central railroads. It is the center of an important oil region and its business is derived largely from that source. It is also important as a center for a large agricultural area and nearby are large deposits of clay and coal. The city has natural gas. Pop. 1920, 7,422.

CISTERCIANS, religious order of monks and nuns, following the rule of St. Benedict, and founded by St. Robert, abbot of Molesme, Langres, 1098, in the forest of Citeaux (Lat. *Cistercium*), France. Within a cent. the Cistercians possessed 800 important abbeys on the Continent, and before the Reformation numerous convents in Britain. Silence, abstinence from flesh meat, manual labor, etc., are included in the rule. At present they are divided into three bodies, the most important of which is the Trappists.

CITEAUX (47° 9′ N., 5° 5′ E.), village, Côte d'Or, France; celebrated for abbey, headquarters of Cistercian order, founded 1098.

CITHÆRON (38° 13′ N , 23° 30′ E.), mountain range separating Bœotia from Megaris and Attica; figures in numerous Gk. myths.

CITHARA, ancient stringed musical instrument, of the lyre kind; invented before Christian era.

CITRIC ACID, OXYTRICARBALLYLIC ACID ($C_3H_4(OH)(COOH)_3$), tribasic acid, crystallizing in colorless rhombic prisms, of an agreeable sour taste; M.P. 150°; occurs in lemons, citrons, oranges, gooseberries, and other fruits. Its salts are called citrates. C. acid is used in calico printing, in the preparation of beverages, and in medicine as a refrigerant and antiscorbutic, and to reduce obesity. The citrates increase the alkalinity of the blood, and iron and quinine citrate is a valuable tonic.

CITRUS, genus of evergreen shrubs and trees (order Rutaceæ) with fragrant white blossoms and sometimes with axillary thorns, bearing luscious edible fruit with a tough skin or peel. Natives of tropical Asia, they are now widely cultivated in Mediterranean countries, Madeira, W. Indies, Florida, and California, the principal species being the lemon (*C. limonum*), the citron (*C. medica*), the lime (*C. limetta*), the Seville orange (*C. vulgaris*), the sweet orange (*C. aurantium*), the mandarin (*C. nobilis*), the kumquat (*C. japonica*), the shaddock (*C. decumana*).

CITY MANAGERS. See COMMISSION PLAN.

CIUDAD BOLIVAR (8° 8′ N., 63° 57′ W.), city, river port, on Orinoco; capital of Bolivar, Venezuela; commercial center; cattle, tobacco. Pop. 13,000.

CIUDAD JUAREZ (31° 47′ N., 106° 25′ W.), town, on Rio Grande, Chihuahua, Mexico; has large transit trade with U.S.A., having a customs station. Pop. 7,000.

CIUDAD PORFIRIO DIAZ (28° 44′ N., 100° 30′ W.), town, on Rio Grande, Coahuila, Mexico; on border of Texas. Pop. 6,000.

CIUDAD REAL (39° 5′ N., 3° 50′ W.), province, Spain; traversed E. to W. by Guadiana; wide undulating plains; dry climate; rich in minerals, iron, silver, copper, lead; sheep and cattle rearing; brandy, wine; area, 7,620 sq. miles. Pop. 433,000.

CIUDAD REAL (38° 59′ N., 3° 58′ W.), town, Spain; woolen cloth, gloves. Pop. 15,000.

CIUDAD RODRIGO (40° 36′ N., 6° 32′ W.), fortified town, Salamanca, Spain; is episcopal see and has XII.-cent. cathedral; surrendered to Marshal Ney, 1810; recaptured by British under Wellington, 1812, who for this received title of Duke of C.R. and other honors. Pop. 9,000.

CIVET FAMILY (*Viverridoe*), a family of carnivores (*q.v.*), containing about 150 species, confined to the Old World; with long flexible bodies, long faces, and rather short legs. They include the Fossa (*Fossa*), a peculiar creature, 5 feet long, confined to Madagascar; the Genets (*Genetta*), ranging over southern Europe, and Asia, and Africa, with brownish-yellow or greyish fur, marked by darker spots and stripes; the weasel-like Linsangs (*Linsang* and *Poiana*) of Asia and Africa; the arboreal palm civets (*Paradoxurus*), and mungooses, mongooses, or ichneumons (*Herpestes*, etc.) from the same areas, the latter group, however, having a single representative in Spain; and the true civets, bintourongs and meerkat (*Suricata*).

CIVICS. See GOVERNMENT.

CIVIC ASSOCIATION, AMERICAN, a voluntary organization for cultivating civic beauty in communities. It aims to promote and perpetuate artistic improvements in cities and towns, to preserve landscapes, and develop outdoor art. The association dates from 1904 and is a combination of two early societies having a similar object—the American League for Civic Improvement and the American Park and Outdoor Art Association. It is an outgrowth of local efforts by various towns in improving their appearance. These initial steps at cultivating civic beauty resulted in the larger movement organized through the association and reaching communities at large. The fruit of extensive propaganda aiming at a nation-wide realization of civic art and beauty was the adoption by many cities of comprehensive city plans, the enlisting of the services of landscape architects, and systematic urban development on a basis of artistic coordination. The Society's efforts have been directed to the creation and maintenance of city park areas, boulevards, playgrounds for children and recreational areas for adults, and to the beautifying of water fronts, the elimination of needless smoke, noise and disfiguring billboards, and to country planning, or the beautifying of rural districts. The association's activities for preserving scenery was successfully reflected in the extension of the American National Park system and in the protection of Niagara Falls from spoliation by commercial interests. The Society meets annually and has its headquarters at Washington, D.C.

CIVIDALE DEL FRIULI (46° 4′ N., 13° 25′ E.), town, on Natisone, Venetia, Italy; ancient *Forum Julii*; has notable cathedral and museum of antiquities; silk. Pop. 5,000.

CIVIL ENGINEERS, AMERICAN SOCIETY OF. See AMERICAN SOCIETY OF CIVIL ENGINEERS.

CIVIL LAW, local law of a state, more particularly that derived from the Rom. *jus civile*, and distinct from international law.

CIVIL LIST, the name given in England to that portion of the national expenditure which goes to the upkeep of the king and royal family, with the various expenses of the crown. Until the reign of William and Mary all the national expenses, other than those of war, were grouped together, but then the sum of £700,000 a year was set aside, not only for the personal expenses of the sovereigns and the royal household, but for pensions and the civil service. When George III. came to the throne a certain fixed sum was settled for the C. L., not as heretofore the source of revenue, and the surplus, should there be any, was no longer to go to the king. In the reign of William IV. the crown was relieved of all that really belonged to the expenses of Government, and the C. L. became solely for the upkeep of the royal family.

CIVILIZATION is the condition of advanced nations, as compared with that of savage and barbarous peoples; it is result of long evolutionary processes and its history is that of material and moral development of mankind. There are, however, two movements always going on in all communities—one progressive, the other retrogressive: if former is predominant, community advances; if latter, it stands still or degenerates. Generally speaking, community which is continually in contact with other c's progresses; while one that is isolated either retrogrades or remains stationary; good example of stationary c. is China, where it dates back to several millennia B.C., but has made little advance throughout many cent's.

Chief physical influences which have affected c. are climate, food, soil, and general aspect of nature. One of first factors in social development is accumulation of property. So long as each man must work to live, and consumes as much as he produces, neither science nor organization can be created; but as soon as production surpasses consumption there grows up beside working class an intellectual class which creates science on which progress of c. depends. Accumulation of property depends on energy of worker and also on return obtained for work; of these causes first depends on climate, second on fertility of soil. An examination of history shows that no people has of itself attained c. unless one of these conditions was favorable; thus in Asia c. was limited to district of fertile alluvial soil, stretching from E. China to Asia Minor. In N., where soil was unproductive, Mongols and Tartars remained in barbarous state until comparatively recent date. Arabs made little progress owing to the poverty of their soil until they were enabled, by their conquests of Persia, Spain, and Lahore, to accumulate wealth. Eastern c. generally was thus due to fertility of soil; in W., favorable climatic conditions were more important factor; in Europe, climate developed energy and was favorable to work.

Progress of c. has from time to time received great impetus from discoveries and practical inventions. Earliest and perhaps most important was discovery of uses of fire in prehistoric times; before this discovery man lived chiefly on fruits and nuts, but after it animal foods were added to his diet. Another and much later invention was that of system of writing, which must have occurred in VII. millennium B.C., and was important step in human progress. In modern times, exploration, intercommunication of advanced races, progress of science and invention have promoted c. amazingly.

CIVIL SERVICE, AMERICAN, the civil administration of government departments other than the army and navy branches, as represented by public officials whose employment ranks them with civilians. As an institution the civil service is chiefly identified with the conduct of national government divisions. Its modern development, both in the great numbers of its personnel and the volume and character of its functions, projects it as representative of every duty included in the ever widening sphere of government activities. In the United States, the federal civil service embraces the executive departments, including the railway mail, Indian and Marine Hospital Services, the pension agencies, and the mint and assay offices; the custom-house; the post-office; the government printing office; and the internal revenue establishment. Political favoritism ruled largely in filling government posts of every grade in the country's early days, though Washington, Adams and other Presidents sought to select appointees by fitness. As it is today in the high branches, tenure in the civil service was at the mercy of changes of government.

It was at last recognized that wholesale replacements as one political party succeeded another worked to the serious detriment of the conduct of public business. In 1833 the Merit System was established by the Civil Service Law, which created a commission and authorized the President to extend the system by executive order. Thus what became known as the classified service was established, and various grades of government employes have been added to it since. Even the classified service, however, has been tampered with by politics, more than one President having withdrawn from it certain classes of offices to enable them to provide appointments for their supporters. In recent years, Presidents have shown an increasing tendency to adhere to the merit system by appointing candidates for available posts, after they have been tested by competitive examinations. Under the merit system, public employes are forbidden to pay any contributions to party funds out of their salaries and are protected from being forced to perform political services in order to hold their places. The whole intent of the merit system is to keep politics out of the public service, though it is not always successful in doing so.

The number of government positions in 1922, both classified and unclassed, was 69,980 in Washington and 490,883 elsewhere. There were 354,560 competitive posts in the classified service, for which 201,999 were examined, and of these 47,170 were appointed. Classified employes on reaching certain ages are automatically retired from the service unless certified for continuance. Railway mail clerks retire at 62, mechanics, post-office clerks and carriers at 65, and all others at 70. Those who have served 15 years or more are entitled to an annuity based on length of service. The merit service has also been adopted by a number of states and incorporated cities.

CIVIL SERVICE REFORM LEAGUE, NATIONAL, an organization founded in 1881 to promote governmental administrative efficiency by the establishment and proper operation of a system of appointment and promotion in the civil service based on merit. It has local associations and auxiliaries throughout the country and these form a federation. The League meets annually and ventilates questions relating to its mission. It sustains an unwavering activity to seeking needed reforms in the conduct of the civil service. It has particularly leveled its criticism at post-office appointments and seeks to extend the civil service law to all postmasters. It urges the employment of business organizers and efficiency specialists in government departments; the securing of capable management by professional and scientific experts with permanent tenure and independent of political partisanship; the removal of the great burden imposed on national and state taxation through the waste and inefficiency resulting from the spoils system; the extension of competitive tests; and the application of the merit system to all branches of the foreign service, and to internal revenue officers, U.S. marshals, under-secretaries and thousands of other positions exempted from competitive examination by acts of Congress. In 1921 Richard Henry Dana was the League's president.

CIVIL WAR, AMERICAN, a conflict that was waged between the northern and southern divisions of the United States from 1861 to 1865 to determine the issue of slavery. It ended with the emancipation of all slaves, thus settling a sore question that had embittered the country for a generation and more. Slavery became a live political issue with the admission of Texas into the Union in 1844, the new state becoming an accession to the slavery party. The question also figured in determining the status (slave or non-slave) of the new territory brought into the Union as a result of the Mexican war in 1848. Henceforth slavery became the most prominent issue in American politics. The North stood out against adding more slave territory as the country grew. Some held for abolition; others that the institution of slavery should be confined to the Southern states where it had been established. On the other hand the slave party wanted the privilege of owning slaves extended into new areas. The issue turned on absolute exclusion or local option, the latter phrased as 'squatter sovereignty' or 'popular sovereignty,' or the right of a state or territory to decide for itself. Oregon, when organized as a territory in 1848 forbade slavery, and new settlers in California kept that region slave-free in the gold rush of 1849 by preventing slave holders from utilizing their slaves to compete with them in gold washing.

Henry Clay in 1850 tried to settle the issue by proposing a series of compromise measures respecting the slavery status of New Mexico, Texas, California (including the present Nevada and part of Colorado), a new and more drastic fugitive slave law, and the abolition of the slave trade in the District of Columbia. The Northern states interfered with federal enforcement of the fugitive slave law and rescue of escaped slaves were general. The publication of Mrs. Harriet Beecher Stowe's *Uncle Tom's Cabin*, in 1851, aggravated the issue. The division in 1854 of the Nebraska territory into two parts, Nebraska and Kansas, each division to determine the question of slavery by popular vote, threw open, by the terms of the empowering act, the whole Louisiana Purchase to possible slave holders. It also made the new territories a stamping ground for violent agitation. The Kansas-Nebraska measure brought into existence the new Republican party under Lincoln, opposing slavery extension, and in large part fomented the situation that produced the Civil War.

The Democrats were in power, and the Presidential election of 1856 enabled them to hold their own, with James Buchanan as President; but the North sent a strong Republican body to Congress, where the sectional division of parties over the extension of slavery became sharply defined. Matters were made worse by the Dred Scott case, 1857, in which the Supreme Court held that a slave was not a citizen and had no legal standing, that Congress could not prohibit slavery in the territories, and that the Constitution protected slave property. Other forerunners of the war were the celebrated debates between Lincoln and Douglas, an attempted slave insurrection under John Brown, and the Presidential election of 1860, which elected Lincoln, and showed that within the Union the slave states were in a hopeless minority.

In face of the Republican victory the Southern states affected began to secede, South Carolina leading, followed by Mississippi, Florida, Alabama, Georgia, Louisiana and Texas. These states in February, 1861, formed the Confederate States of America, and made Jefferson Davis President. They appropriated most of the federal custom houses, arsenals, and forts within their borders. While Buchanan remained in office, nothing was done to resist the action of the seceding states. On April 12, 1861, an attack on Fort Sumpter by South Carolina troops, shortly after Lincoln took the reins of government, precipitated events. The fort had been compelled to surrender two days later, whereupon the President called for 75,000 troops to uphold the federal government, and the Civil War was begun. Virginia, Arkansas, Tennessee and North Carolina joined the seceders, but four slave states, Missouri, Kentucky, Maryland and Delaware, adhered to the Union. General Robert E. Lee commanded the Southern forces, and General G. B. McClellan headed the Union armies, to be succeeded later by General Ulysses S. Grant.

Most of the year 1861 was devoted to organization and the engagements that took place were of no great importance. The Confederate line through Missouri, Kentucky and West Virginia, at the year's close had shifted more to the south than where it was when first formed, but the solid South had not so far felt the weight of Union forces. At the beginning of 1862, the Union troops in the field numbered 450,000 and the Confederates 350,000. Union successes of that year effected a cleavage in the territory held by the Confederates through Missouri, Kentucky, Tennessee, Arkansas, Mississippi and Louisiana to the coast, and obtained a hold on North Carolina and Maryland. With the close of the next year the Union's inroads on the Confederate's areas had widened in Arkansas, Tennessee, Mississippi and Louisiana, and extended through northern Texas. In 1864 the great gap thus made by the Union armies was retained and increased, and Sherman made another cleavage by his march through Georgia. The final campaign in 1865 found the Confederate forces under Lee in retreat through Virginia, with Grant's Union army pursuing them, and Sheridan, heading another federal corps, interposing and cutting off their flight. Lee surrendered to Grant at Appomattox Court, on April 9, and the Confederacy thus came to an end.

The outstanding features of the war, which lasted four years, were the first battle of Bull Run, July 21, 1861, won by the Confederates; the raising of the Army of the Potomac by McClellan; the blockading of the Southern coast by the federal navy in a four-fold task of stopping the exports of cotton, imports of war material, protecting Union commerce afloat and hindering the creation of a Confederate navy; the capture of New Orleans by Farragut and Butler, April 18-25, 1862; the capture of Fort Donelson on the Cumberland river by Grant and the surrender of 15,000 Confederate troops, February 16, 1862; the naval fight between the Merrimac and Monitor, March 8-9, 1862; the battle of Anteitam, September 17, 1862; the capture of Vicksburg, July, 1863; the battle of Gettysburg, July, 1863; the battle of Cold Harbor, June, 1864; and Sheridan's and Sherman's campaigns. See UNITED STATES, HISTORY OF.

CIVITA CASTELLANA (42° 17′ N., 12° 26′ E.), town and episcopal see, Rome, Italy; with cathedral and citadel;, near site of ancient city, Falerii. Pop. 5,000.

CIVITA VECCHIA (42° 6′ N., 11° 48′ E.), seaport town, on Mediterranean, Rome, Italy; episcopal see; Rom. relics; ancient Portus Trajani. Pop. 12,000.

CLACKMANNAN (56° 7′ N., 3° 45′ W.), county town, on Devon, Clackmannanshire, Scotland; ancient market cross; ruins of Clackmannan Tower, once seat of Bruces; has spinning mill; coal mines.

CLACKMANNANSHIRE (56° 7′ N., 3° 46′ W.), smallest county, Scotland; lies between Ochil Hills and Forth; area, 55 sq. m.; surface partly flat (carse), partly undulating and hilly; fertile soil; well cultivated; uplands afford excellent pasturage; rich in minerals; towns—Alloa, Clackmannan, Alva, Dollar, Tillicoultry; principal stream, Devon; coal extensively mined; woolen manufactures; distilleries. Pop. 1921, 32,543.

CLACTON-ON-SEA (51° 48′ N., 1° 9′ E.), watering place, Essex, England. Pop. 10,000.

CLAIRVAUX (46° 35′ N., 5° 42′ E.), village, Aube, France; site of famous Cisterciam abbey, founded by St. Bernard, 1115; C. has important ironworks.

CLAIRVOYANCE is power claimed by spiritualistic 'mediums,' of seeing things invisible to ordinary persons, when in hypnotic condition; astuteness of professional mediums has rendered scientific investigation on the subject extremely difficult.

CLAM, family of bivalves found in mud and gravel bottoms; giant c. (*Tridacna gigas*) is often 3 or 4 feet in length; soft c. (*Chama arenaria*) is considered a delicacy.

CLAN (Gaelic *Clann*), the name given in Scotland and Ireland to a group of families often living together as a community. In ancient Ireland several 'septs' or communities formed a c., and each sept was divided into several households. Alike in Scotland and Ireland the Celtic tribalism which a real c. system necessitates was overlaid by Anglo-Norman feudalism, though it maintained itself in Scotland side by side with the mediæval baronage and then of modern developments down to the XVIII. cent. Owing to the support given by some c's to the Pretender, a determined effort was made to root out the c. system, and the wearing of Highland dress was forbidden. C. feeling, however, still survives among a group of families, not always all of the same name, and the 'chief' is looked up to with veneration.

CLANRICARDE, ULICK DE BURGH, MARQUESS OF (1604-57 or 1658), succ. his *f.* as 5th earl. 1635; sat in Short Parliament of 1640; was R.C. and supported Charles I.; commanded royal forces in Connaught; surrendered to Parliament in 1653.

CLAPARÈDE, JEAN LOUIS RENÉ ANTOINE, ÉDOUARD (1832-70), Swiss zoologist; prof. of Comparative Anat. at Geneva; made biological investigations, especially on Annelidæ, in Norway, the Hebrides, Bay of Biscay, and at Naples.

CLAPPERTON, HUGH (1788-1827), Scot. explorer; from 1822 explored North and Central Africa; crossed the Niger, and *d.* in Sokoto, 1827.

CLAQUE, body of people who are hired to applaud in Fr. theatres; system dates from ancient times; organized in France beginning of XIX. cent.

CLARE (52° 50′ N., 9° W.), maritime county, Munster, Ireland; area, 1,200 sq. miles; bounded N. by Galway, E. by Tipperary, S. by Shannon estuary, W. by Atlantic; surface generally hilly, with some level tracts; bogs in W.; drained by Shannon and Fergus; chief lake, Lough Derg, on eastern boundary; coast precipitous and much indented; chief islands, Aran Islands; chief town, Ennis. Pop. 104,232.

CLARE, JOHN (1793-1864), Eng. poet; author of *Poems of Rural Life*, 1820; *The Village Minstrel*, *The Rural Muse*, etc.; *d.* insane.

CLARE, ST. (1194-1253), disciple of St. Francis; abbess of San Damiano, Italy, a convent of Poor Clares (enclosed contemplative order), which she, with St. Francis, founded.

CLAREMONT, a town in New Hampshire, in Sullivan co. It is on the Boston and Maine railroad, and on the Sugar river, 48 miles northwest of Concord. Adequate power is supplied by the Sugar river which has a fall of 150 feet to the mile. There are cotton and woolen mills, paper and shoe factories, and machine shops. The town is also the center for a large agricultural region. There are churches, newspapers, high schools, a library, etc. Pop. 1920, 9,524.

CLARENCE, DUKES OF.—(1) Lionel (1338-68), third *s.* of Edward III.; *m.* Elizabeth de Burgh (heiress of the Clares, *q.v.*); his dau. and heiress, Philippa, *m.* Edmund, Earl of March. (2) Thomas (*c.* 1388-1421), second *s.* of Henry IV. (3) George (1449-78), bro. of Edward IV.; perished in Tower. (4) William, afterwards William IV. (5) Albert Victor (1864-92), eldest *s.* of Edward VII.; cr. duke, 1890.

CLARENCEUX, one of the two Kings-of-Arms in England; has jurisdiction over all England south of Trent.

CLARENDON, CONSTITUTIONS OF, a code of laws, promulgated at Clarendon, 1164, by Henry II., for the purpose of settling differences between Church and State.

CLARENDON, EDWARD HYDE, 1ST EARL OF (1609-74), Eng. statesman; *s.* of Henry Hyde, of Dinton, Wilts; ed. at Oxford, and called to the bar in 1663. Though supporting Charles he did not always see eye to eye with him. He left England in 1648, and was one of Charles II.'s companions and advisers in exile. He was partly responsible, even if indirectly, for the defeat of the Eng. fleet by the Dutch in the Medway in 1667.

CLARENDON, HENRY HYDE, 2ND EARL OF (1638-1709), Eng. politician; *s.* of 1st earl; M.P. for Wilts, 1661; became earl, 1674; Lord-Lieutenant of Ireland, 1685-87; opposed James II.'s Declaration of Indulgence, but was hostile to William and Mary.

CLARET, Eng. name for red Bordeaux wines.

CLARETIÉ, JULES ARSÉNE ARNAUD (1840-1913), Fr. dramatist, novelist, historian, and man of letters; director of the Comédie Française since 1885.

CLARINET, CLARIONET, wooden instrument with a single reed; three varieties; C, A, and B flat.

CLARK, ALVAN, (1808-1887), an American astronomical instrument maker, *b.* in Ashfield, Mass. In the early part of his career he was a portrait painter and wood engraver, but in 1844 he became an optician and still later began to manufacture lenses for telescopes. The instruments of his production became world-famous and are found in many of the best astronomical observatories. He also manufactured the first acromatic lenses in the United States.

CLARK, SIR ANDREW, Bart. (1826-93), Scot. physician, practiced in Aberdeen and afterwards in London with much success; pres. of Royal Coll. of Physicians, 1888; author of several medical works.

CLARK, CHAMP (1850-1921), a U. S. Congressman; *b.* in Anderson County, Ky. He was educated at Bethany College and the Cincinnati Law School. In 1893 he was elected to Congress from Missouri, and re-elected three times after, on a Democratic ticket. Early in his Congressional career he showed marked ability as an orator and in the 62nd Congress was Speaker of the House. In 1912, at the National Democratic Convention, in Baltimore, he was one of the leading candidates for the Presidential nomination, Woodrow Wilson defeating him only after 46 ballots had been cast. He continued to be Speaker until well into 1919 and was the Democratic minority leader in the 66th Congress.

CLARK, CHARLES EDGAR (1843-1922), an American naval officer, *b.* in Brantford, Vt. He graduated from the Military Academy at Annapolis in 1863 and served during the balance of the Civil War in the blockading squadrons. At the outbreak of the Spanish-American War, in 1898, he was in command of the battleship Oregon, and roused popular enthusiasm by sailing her around the

Horn from San Francisco to Key West, a distance of 13,000 miles in 65 days, thus giving the American fleet blockading the Spanish ships in Santiago, Cuba, such a preponderance of power as to enable them easily to defeat the Spaniards when finally they did emerge. Captain Clark was promoted to the rank of rear-admiral in 1902, was president of the Naval Retiring Board during 1904-5, after which he was retired.

CLARK, CHARLES HOPKINS (1848); *b.* in Hartford, Conn., A.B. and A.M., Yale University, 1871; L.H.D., Trinity College, 1910. Became connected with the Hartford Courant in 1871 and was made editor-in-chief in 1900. Was pres. and dir. of the Hartford Courant Company; also director of the Connecticut Mutual Life Insurance Company and the Phoenix Fire Insurance Co. In 1902 was the Collins co. member of the Connecticut Constitutional Convention and in 1909 became director of the State Reformatory. Was director of the Hartford Public Library and the Good Will Club and associate president Fellow Corpn. of Yale University, 1910. Also trustee of Wadsworth Athenaeum and Watkinson Library, Hartford.

CLARK, CLARENCE DON (1851), a U. S. Senator; *b.* at Sandy Creek, Oswego County, N. Y. After graduating from the State University of Iowa, he began to practice law, in 1874, first in Iowa, after 1881 in Evanston, Wyo. In 1888 he was elected to Congress on a Republican ticket, and in 1895 to the U. S. Senate. He was re-elected for the terms 1899-1905, 1905-11 and 1911-17. In 1919 he was appointed a member of the International Joint Commission.

CLARK, EDGAR ERASTUS (1856), an American public official; *b.* in Lima, N. Y. After graduating from the Genesee Wesleyan Seminary, in his native city, he was for sixteen years in the railroad business, after which he entered the service of the Order of Railway Conductors of America, as Grand Senior Conductor. President Roosevelt appointed him a member of the Commission to determine the issues involved in the strike of the anthracite coal miners, in 1902. From 1906 till 1921 he was Interstate Commerce Commissioner.

CLARK, FRANCIS EDWARD (1851), an American clergyman, and founder of the United Society of Christian Endeavor; *b.* in Aylmer, Quebec, Canada. He was educated at Dartmouth College and the Andover Theological Seminary, after which he became pastor of the Williston Congregational Church, in Portland, Me. Here, in 1881, he founded the first society of the Society of Christian Endeavor, which has since spread all over the North American Continent and into many other countries of the world. Since 1887 he has devoted himself entirely to his office as president of the United Society of Christian Endeavor. Among the numerous works he has written are *Our Vacations*, 1874; *The Church and the Young People*, 1882; *Christian Endeavor Saints*, 1890; *Old Lanterns for New Paths*, 1898; and *The Gospel of Out-of-Doors*, 1920.

CLARK, GEORGE ROGERS (1752-1818), American soldier and pioneer; *b.* Monticello, Va. He first became prominent as a leader among the early settlers in Kentucky after learning the profession of a land surveyor and taking part in the Shawnee Indian wars in Ohio. He represented Kentucky in the Virginia legislature in 1776 and took a distinguished part in the Revolutionary War. Commissioned by Governor Patrick Henry to raise troops to capture the British posts in Illinois, he obtained the rank of lieutenant-colonel, and in the summer of 1778 gained possession of Kaskaskia, Cahokio and Vincennes. Later, as a brigadier-general, he tried to take Detroit from the British, but did not succeed. His achievements in the frontier country, then known as the Northwest, virtually gave the new republic the great territory between Mississippi and the Alleghenies, for his conquests undoubtedly contributed to securing this region to the United States by the treaty of peace with Great Britain in 1783. After the war he resumed his leadership in frontier warfare against the Indians. Virginia gave him an annuity and a grant of land for his services in the revolution.

CLARK, JOHN BATES (1847), an American political economist, *b.* in Providence, R. I. He graduated from Amherst College, in 1872, then studied for nearly three years in Germany. Since 1895 he had been professor of political economy at Columbia University, and director of the division of economics and history for the Carnegie Endowment for International Peace. Among his works are *The Philosophy of Wealth*, 1885; *The Control of Trusts*, 1901; *The Problems of Monopoly*, 1904; and numerous articles in economic reviews.

CLARK, JOHN MAURICE (1884), *b.* in Northampton, Mass. Graduated from Amherst in 1905; A.M., Columbia University, 1906; Ph.D., 1910. Was instructor in economics and sociology, Colorado College, Colorado Springs, from

1908-10; associate professor of economics, Amherst College, 1910-15, and in 1915 became associate professor of political economy of the University of Chicago. Member of the American Econom. Association; Academy of Political Science; American Academy of Political and Social Science; American Association for Labor Legislation and the Western Econ. Association. Author: *Standards of Reasonableness in Local Freight Discriminations*, 1909, and was joint author of *Control of Trusts*, 2nd edition in 1912, and *Reading the Economics of War*, in 1918.

CLARK, JOSIAH LATIMER (1822-98), Eng. inventor and electrician, concerned in improvement of telegraphs, submarine cables, etc.

CLARK, KATE UPSON (1851), *b.* in Camden, Ala. Graduated from Wheaton College, Norton, Mass., in 1869, and from Wheatfield (Mass.) Normal School in 1872 (hon. litt.D., Wheaton, 1919). Married Jan. 1, 1874, to Edward Perkins Clark, a journalist (*d.* Feb. 16, 1903). Was a lecturer on literary, educational and domestic topics and in addition to editing many periodicals she contributed to various leading magazines and also religious weeklies. Author: *Bringing Up Boys* and *White Butterflies*, in 1900; *How Dexter Paid His Way*, 1901; *Move Upward* and *Up the Witch Brook Road*, 1902; *The Dole Twins*, 1906; *The Adventures of Spotty*, *Donald's Good Hen*, and *Art and Citizenship*, in 1907, and *Teaching the Child Patriotism*, in 1918.

CLARK, ROBERT FRY (1880); *b.* in Galt, Ont. Came to the United States in 1898. Graduated from Central College, Ind., 1901; A.B., Oberlin, 1902;. A.M., University of Chicago, 1906. Was professor of foreign languages at Central College from 1902-5; principal of Washburn Academy at Topeka, Kansas, 1906-11; and associate professor of economics and sociology of Colgate University from 1913 to 1914. Was acting president of Pacific University from 1917 to 1919 in which year he was made president.

CLARK, VICTOR SELDEN (1868), an American economist, *b.* at Portageville, N. Y. He was educated at the University of Minn. and was a student at the universities of Gottingen and Berne. He was high school principal and superintendent in Minn. from 1893-7 and later was supt. of public instruction and president of the Insular Board of Education of Porto Rico. From 1902-9 he was engaged in investigating foreign and insular labor conditions for the U. S. Govt., in 1910 was in charge of the census of Hawaii and from then until 1913 was commissioner of immigration, labor and statistics of that Territory. He wrote many books on foreign labor conditions.

CLARK, WILLIAM ANDREWS (1839), a U. S. Senator; *b.* near Connellsville, Pa. He studied law in Mt. Pleasant (Ia.) University, but did not practice, going into business instead, becoming a banker and a mine owner in Montana, as well as president and director of numerous corporations in that state. He was president of the State Constitutional conventions in 1884 and 1889, and Democratic candidate for delegate to Congress in 1888. He was elected to the U. S. Senate in 1898, but because of a contest which ensued he resigned. In 1900 he was again elected, for the term 1901-07. He lived for many years in New York City, where he built a magnificent residence and became widely known as a connoisseur of art.

CLARK, WILLIS GAYLORD (1810-1841), an American writer and poet, popular during his own time; *b.* at Otisco, N. Y. He was proprietor and editor of the Philadelphia Gazette, but first attracted attention through his contributions to the Knickerbocker Magazine, edited by his brother, Lewis Gaylord Clark, who issued his complete works after his death, in 1844. His poetry was serious, somewhat heavy, the most readable of his works being, *Ollapodiana Papers*, prose sketches in a lighter vein.

CLARK UNIVERSITY, an institution for graduate study only, in Worcester, Mass. It was founded in 1889. In 1821 the faculty numbered 31 and the student body was 337. The income for that year was $191,620. The library contains 96,000 volumes.

CLARK UNIVERSITY, a co-educational institution in Atlanta, Ga., organized in 1870, under the auspices of the Methodist-Episcopal Church. In 1921-22 it had a student body of 490 and 20 instructors or professors on the faculty. Its library has about 5,000 volumes and its resources amount to about $250,000.

CLARKE, CHARLES COWDEN (1787-1877), Eng. author and scholar; author of *Shakespeare's Characters*, 1863, etc. His wife, Mary Cowden Clarke, 1809-98, compiled a valuable *Shakespeare Concordance*, 1844-45; wrote *Girlhood of Shakespeare's Heroines*, etc.

CLARKE, EDWARD DANIEL (1769-1822), Eng. traveler and mineralogist; traveled in Europe, Palestine, and gypt, collecting valuable statues, manu- ripts, etc.; prof. of Mineralogy at ambridge, 1808; pub. works on travel ıd archæology.

CLARKE, FRANK WIGGLES- /ORTH (1847), an American chemist, in Boston, Mass. He graduated from ıe Lawrence Scientific School, of Har- ard University, and was professor of ıemistry successively at Howard Uni- ersity, Washington, and the Uni- ersity of Cincinnati. Since 1883 he has een chief chemist of the U. S. Geological urvey. Among his works are *Weights, leasures and Money of All Nations*; *lements of Chemistry*; *Laboratory lanual of Elementary Chemistry* (in ollaboration with Louis M. Dennis) nd many papers and bulletins of the . S. Geological Survey.

CLARKE, JAMES FREEMAN (1810- 888), an American writer and bolitionist, *b.* in Hanover, N. H. le graduated from Harvard University, 1 1829, and from the Cambridge ivinity School, in 1833, after which he as ordained a minister in the Unitarian hurch. Together with Emerson he dited the *Memoirs* of Margaret Fuller ssili, in 1869, but his fame rests on is powerful speeches in favor of the bolition of slavery during the period receding the Civil War. He also wrote, mong his works being *Eleven Weeks n Europe*, 1854; *The Christian Doctrine f Prayer*, 1854; *Essentials and Non- ssentials in Religion*, 1878; *Anti- lavery Days*, 1884, and *Sermons on the ord's Prayer*, 1888.

CLARKE, JOHN HESSIN (1857), an merican jurist, *b.* at Lisbon, O. raduating from the Western Reserve niversity, he was admitted to the bar, n 1878, was for many years engaged in rivate practice, in Cleveland, O., nd became U. S. District Judge for the orthern District of Ohio, in 1914. In 916 he was appointed associate justice f the Supreme Court of the U. S.; resigned in 1923.

CLARKE, JOHN MASON (1857), an American geologist, *b.* at Canandaigua, N. Y. He was educated at Amherst and at the University of Gottingen. He was professor of geology and mineralogy at Smith College from 1881-4 and same at Renssalaer Poly. Inst. in 1894. In 1904 he became state geologist and paleontologist and director of the State Museum and the science department of the University of the State of New York. In addition to writing numerous geol. and paleontol. books and papers he was the author of: *Sketches of Gaspe, The Magdalen Islands, Life of James Hall, Heart of Gaspe.*

CLARKE, MARCUS ANDREW HISLOP (1846-81), Australian author; wrote *For the Term of His Natural Life*; also dramatic pieces.

CLARKE, SAMUEL (1675-1759), Eng. divine and philosopher; among most important works are his Boyle Lectures, *On the Being and Attributes of God*, 1704; and his correspondence with Leibnitz, 1717.

CLARKE, WILLIAM BRANWHITE (1798-1878), Brit. geologist and clergyman; he made the first discovery of gold, 1841; of tin, 1849; and of the diamond, 1859, in Australia, and contributed other researches valuable to the development of that country and to science.

CLARKSBURG, a city of West Virginia, in Harrison co., of which it is the county seat. It is on the Baltimore and Ohio and the Monongahela Traction Company railroads and on the Monongahela river. The industries which are important include the manufacture of fire brick, bottles, tableware, chemicals, etc. The city has an Elks Home and three hospitals. It is the center of an important oil, coal and natural gas region. Pop. 1920, 27,869.

CLARKSON, THOMAS (1760-1846), Eng. anti-slavery agitator; traveled to collect evidence on subject, and got bill brought into House of Commons.

CLARKSVILLE, a city of Tennessee, in Montgomery co., of which it is the county seat. It is on the Louisville and Nashville, and the Tennessee Central railroad and on the Cumberland and Red rivers, 50 miles northwest of Nashville. It is the center of the famous dark tobacco belt and in the city are many tobacco factories. Here is the Southwestern Presbyterian University and a State Odd Fellows' Home. There are also private and public schools, banks, newspapers, etc. Pop. 1920, 8,110.

CLASSICS. The term *classic*, first given by Aulus Gellius (2nd cent. A.D.) to writers of universally acknowledged greatness, is generally applied to any standard literature, particularly to that of ancient Greece and Rome. When the so-called Classical Age of Greece was over (about 300 B.C.), the Gr. writers became objects of study as they are to us, and a 'science' of class. scholarship grew up. In the Alexandrian Age (300 B.C.-A.D. 10) the library at Alexandria became a center of class. study, and its librarians scholars and editors. Zenodotus edited Homer, and Aristophanes of Byzantium other poets besides; later came Didymus, with whom the Alexandrian Age ends. The Alexandriana had a regular canon, beginning with Homer and ending with Polybius. Contemporary with the school of Alexandria was that of Pergamum, 3rd and 2nd centuries B.C.

When Rome had conquered Greece, Greek was the language of the eastern half of the empire; and Rome had much to learn from Greece in letters, as the Romans had never been a literary people. Hence Roman literature followed Gr. models, and educated Romans of this and succeeding times all knew Greek. The Augustan Era was one which produced not only the greatest Latin literature but some literary criticism. Longinus wrote *On the Sublime*, and Dionysius of Halicarnassus criticized Demosthenes. In the next five centuries there were several grammarians, among them were Herodian, and Theodosius of Alexandria. In Latin scholarship during these cents., or just before there were several eminent scholars. Virgil and Horace, who had themselves absorbed so much of Gr. culture, soon became regular authors for critical study. Quintilian was not only a great authority on oratory, but wrote on the literature of his own country as well. One of Suetonius' works, now lost, was used in the 7th cent. by Isidore of Seville. Later, important work was done by Symmachus, Apollinaris Sidonius, and Boethius, the last of whom stands between class. and mediæval culture.

The Middle Ages are sometimes referred to as if during the whole of that period a total eclipse of class. learning and everything pertaining to anc. civilization took place, only to be brought to light again at the Renaissance. Though there is much truth in this, it must not be pressed too far, for there never was a period when the study of Greek became totally extinct in the West; nevertheless Gr. scholars were but few, and while Latin remained the dominant literary language till the 16th cent., much of the best Latin literature was entirely forgotten and neglected. Greek was studied in Ireland in the 7th and 8th centuries, and in England was introduced by Theodore of Tarsus (*d.* 690), Archbishop of Canterbury. Owing to the work of Alcuin, there was some class. study at the court of Charles the Great. Aristotle was trans. into Arabic in the East, and his works, being taken to Spain by the Moors, were trans. into Latin, and then studied by the schoolmen in Paris and elsewhere. Greek was studied in England by Bishop Grosseteste (*d.* 1253), and by Roger Bacon (*d.* 1294), who wrote a *Greek Grammar.*

The Renaissance began in Italy in the 14th cent., and anc. MSS. were eagerly sought for, and in the 15th cent. much Greek was read in Italy; but in the 16th cent. the New Learning found its chief home N. of the Alps. The greatest of Renaissance scholars was Erasmus, who taught and studied in England, France, Italy, and Switzerland. Since then class. scholarship has gradually progressed, becoming more scientific, aiming at exact knowledge of the past rather than exact imitation of class. forms of literature in the present. There have been many famous class. scholars in England, France, and Germany. During the 16th and 17th centuries France produced most; in the 18th, England and Germany.

CLASSIFICATION, an arrangement of things into groups or classes, such that the members of any group resemble each other in one or more qualities while differing in these qualities from members of other groups. 'Natural' classification is based on the intrinsic nature of the things classified, while 'artificial' classification is arbitrary, being determined by qualities extrinsic to the real nature of the things.

CLAUDE OF LORRAINE, CLAUDE GELLEE (1600-82), Fr. landscape artist; examples in Louvre and National Gallery.

CLAUDET, ANTOINE FRANÇOIS JEAN (1797-1867), Fr. scientist; introduced daguerrotype photography into England, and invented several instruments concerned with photography.

CLAUDIUS, name of a great Rom. *gens*, containing both patricians and plebians; among well-known members of it were: (1) Appius Sabinus Regillensis, founder of the *gens*, *c.* 504 B. C.; (2) Appius, patrician consul, 471 and 451 B. C.; (3) Appius, patrician consul, 307 B. C.; (4) Appius, friend and correspondent of Cicero.

CLAUDIUS, TIBERIUS CLAUDIUS DRUSUS NEBO GERMANICUS (10 B. C.-54 A. D.), Rom. emperor; *s.* of Drusus, and nephew of Emperor Tiberius; became emperor, 41 A. D.; said to have been poisoned by his wife, Agrippina, mother of Nero.

CLAUDIUS, MARCUS AURELIUS, Roman Emperor, 268-70 A. D.; defeated Goths—hence called Gothicus.

CLAUSEL, BERTRAND, COUNT (1772-1842), Fr. soldier; served in Revolutionary campaign, 1791, and in Peninsular campaign; after Restoration, erved under the Bourbons; marshal of France, 1831.

CLAUSEWITZ, KARL VON (1780-1831), Prussian general; fought in Rhine campaign, 1793-94; in campaign of Jena, 1806; a prisoner two years; helped to reorganize Prussian Army, 1809-12; fought for Russia in 1812, and then served in Prussian army in Waterloo campaign; wrote many military works.

CLAUSIUS, RUDOLF JULIUS EMMANUEL (1822-88), German physicist; prof. of Physics at military school in Berlin, 1850; Univ. of Zürich, 1855; Würzburg, 1867; Bonn, 1869; founder of the science of thermodynamics; formulated many new and now-accepted physical theories.

CLAUSTHAL, KLAUSTHAL (51° 48′ N., 10° 20′ E.), mining town, Harz Mts., Hanover, Germany; chief mines, silver and lead. Pop. 9,000.

CLAVICHORD, early keyboard musical instrument, precursor of the piano. The keys operated on quills which plucked the strings.

CLAXTON, KATE (MRS. CHARLES A. STEVENSON), an American actress, *b.* at Somerville, N. J. She first appeared professionally with Lotta, in Chicago, in 1870. She is best remembered from her performances in *Frou Frou, Called Back, The Double Marriage* and especially as *Louise*, the blind girl, in *The Two Orphans*, which she played more than 4,000 times.

CLAXTON, PHILANDER PRIESTLEY (1862), an American university professor, *b.* in Bedford County, Tenn. After graduating from Johns Hopkins University, in 1885, he traveled abroad, studying educational methods. From 1911 until 1921 he was U.S. Commissioner of Education. Since the latter date he has been provost of the University of Alabama.

CLAW, term designating horny epidermal end of digits of birds, mammals, etc.; in ungulates c's are flattened into hoofs; applied also to chelæ of arthropods.

CLAY, a soft rock, plastic when wet, of varying composition and character, the principal constituent being an extremely fine-grained hydrous aluminium silicate such as kaolin and muscovite, decomposition products of felspars. Chlorite, derived from hornblende, augite, or biotite also enters into the formation of clays, together with calcite, epidote, quartz and other minerals reduced from their position as rock-constituents to a fine-grained state. Most clays are water-borne, and form deposits in lakes and the sea, often in uniform layers (mudstone). Some easily split into leaflets or laminæ, and are known as shales, which frequently contain organic products such as paraffin oil. A few of the more important clay rocks are *red c.*, which forms in the deepest parts of the ocean, and is the most extensive deposit known; *china c.*, consisting mainly of kaolin, is the purest *brick c.*, and *fire c.* vary very much in constitution. Wind-borne, fine calcareous c. is known as loess.

CLAY, ALBERT TOBIAS (1866), an orientalist, *b.* at Hanover, Pa., *s.* of John Martin and Mary Barbara Clay. He was educated at Mt. Airy Theological Seminary and at the University of Pennsylvania. He was an instructor in Hebrew at both of these institutions and was also a lecturer in Hebrew. Assyrian and Semitic archæology at the latter. In 1910 he became Laffan professor of Assyriology and Babylonian literature at Yale University and two years later curator of the Yale Babylonian Collection. In addition to contributing to encyclopedias and scientific periodicals he wrote many books and edited the series of Babylonian Record in the library of J. Pierpont Morgan.

CLAY, CASSIUS MARCELLUS (1810-1903), an American abolitionist, *b.* in Madison County, Ky. He graduated from Yale University, in 1832, and three years later became a member of the Kentucky legislature where, through his direct influence, the legislation was passed which made the jury system and the school system of the state institutions comparable with those of more advanced communities. In June, 1845, he began issuing a periodical called *The American*, in Lexington, which began strongly to denounce slavery. In August his printing establishment was raided and destroyed by a mob, whereupon he retired to Cincinnati, Ohio, and, while having his paper printed there issued it from Lexington, thus continuing his propaganda. During the Civil War, in 1862, he was sent as United States Minister to Russia, remaining there till 1869.

CLAY, CHARLES (1801-93), Eng. surgeon, introduced the operation of ovariotomy, and did much to advance abdominal surgery generally.

CLAY CROSS (53° 10′ N., 1° 25′ W.), town, Derbyshire, England; center of coal and iron district. Pop. 10,000.

CLAY, HENRY (1777-1852), Amer. statesman; entered legal profession, 1797; in 1803 elected to Kentucky legislature, and in 1806 to U.S. Senate. In 1811 he was elected to U.S. House of Representatives, and served as Speaker several times; helped to urge on the war with Britain of 1812. From 1808 onwards he was a pioneer of Protection. His great idea was the maintenance of the Union, and this led him to try to mediate in the slavery question, so that he was mistrusted by slaveholders and abolitionists alike. He made unsuccessful attempts to be Pres. of the U.S. He won renown as a magnificent orator.

CLAYMORE, Highland, cross-hilted, two-edged broadsword.

CLAYTON, JOHN MIDDLETON (1796-1856), Amer. politician; Chief-Justice of Delaware, 1837-39; Sec. of State, 1849-50; noted for association with 'Clayton-Bulwer Treaty', 1850.

CLAYTON-BULWER TREATY. See BULWER-CLAYTON TREATY.

CLAY-WITH-FLINTS, deposits of clay with whole flints or fragments and pebbles, occurring in patches in the south of England, and corresponding to the *argile silex* of the Paris basin, indicating a mingling of lower Eocene beds and chalk.

CLAZOMENÆ, ancient Ionian town, on Gulf of Smyrna, Asia Minor.

CLEARCHUS (*fl.* V. cent. B.C.), Spartan leader; gov. of Byzantium when citizens opened their gates to Alcibiades, 409 B.C.

CLEARFIELD, a borough of Pennsylvania, in Clearfield co., of which it is the county seat. It is on the Pennsylvania, the New York Central, and other railroads, and on the Susquehanna River. It is surrounded by an important coal and fire clay region and it has industries which include the manufacture of novelties, flour, knit goods, brick, sewer pipe, cut glass, etc. Pop. 1920, 8,529.

CLEARING HOUSE, a branch of banking established by bankers for the clearance or balancing of checks payable to or by them. All important financial centers have their clearing houses. Their operation consists in offsetting daily check credits against check debits or vice versa, and the resulting balance in favor of or against a bank sums up its transactions for that day. The clearing system is an outgrowth of the extensive use of negotiable paper in the form of checks. The vast number drawn daily could not be promptly collected by the ordinary method, and resort was therefore made to the system of clearance now established as an integral part of the banking business. The object achieved is a daily settlement of obligations between banks without the need of paying actual money to any extent. In New York, for example, the balances payable in cash seldom amount to more than 5 per cent of the aggregate claims settled.

A person who receives a check pays it into his bank. It becomes one of scores or hundreds of checks his bank receives for collection from other banks. Instead of seeking collection by direct calls on such banks, the bank passes the batch of checks through the local clearing house, where its representative finds these other banks have presented checks for clearance against it. A routine debit and credit settlement results. The balance drawn in adjustment represents a settlement by a single check or cash payment of a multitude of daily transactions that could otherwise have occasioned an infinity of work, not to mention confusion and the chances of error.

The federal reserve banks operate as clearing houses for member banks in the federal reserve system. The former also utilize the clearing house principle in settling with each other their weekly obligations to avert the despatch of large amounts of gold and currency from bank to bank. Each reserve bank telegraphs to every other reserve bank the amount it owes to the latter. The totals are thereupon offset and the balances struck by debits and credits. Back of the weekly clearance is a gold settlement fund held in Washington, each bank keeping a portion of its gold reserve in the form of U.S. gold certificates on deposit in this fund. By the weekly adjustments a change is effected in the ownership of the gold among the banks, though it is not physically disturbed.

The transactions of the New York Clearing House Association, mainly composed of 18 national banks, 11 state banks, and 12 trust companies, may be cited to indicate the volume of modern clearing operations. In 1922 there were daily transactions of exchanges amounting to $706,378,760 and daily balances struck of $69,644,619. In the year the total of exchanges and balances reached 234 billion dollars.

Clearing houses are useful barometers of business conditions. The less checks come in for clearance, the less business is being transacted. Expanded clearance operations therefore point to business revival.

CLEAT, block fastened to upright structure to keep in position slanting upport; double-ended peg for attachment of ropes.

CLEAVERS, CATCHWEED, GOOSE-GRASS (*Galium aparine*), common plant (order Rubiaceæ), in waste places and hedges, with a four-sided stem bearing whorls of narrow leaves and white flowers, and covered with short hooked hairs.

CLEBURNE, a city of Texas, in Johnson co., of which it is the county seat. It is on the Missouri, Kansas, Texas and other railroads. It has an important trade in agricultural products, grain, live stock, hides, etc. and its industries include cotton compresses, flour mills, and railroad shops. The public buildings include a court house, a public library and a high school. Pop. 1920, 12,820.

CLECKHEATON (53° 44′ N., 1° 43′ W.), town, West Riding, Yorkshire, England; woolen goods; machinery. Pop. 13,000.

CLEETHORPES (53° 34′ N., 0° 2′ W.), watering-place, on North Sea, Lincolnshire, England. Pop. 25,000.

CLEF (Lat. *clavis*, key), mark in musical notation, which determines pitch of notes; two c's in general use, treble or G, bass or F; alto and tenor c's used in orchestration.

CLEFT PALATE, a congenital deformity due to incomplete development of the roof of the mouth, the cleft usually being in the middle; operative treatment should be carried out as early as possible.

CLEISTHENES (*fl.* 500 B.C.), Athenian statesman, member of the exiled family of the Alcmæonidæ. About the year 508 B.C. or soon after he began his democratic reforms, in which his object was to complete the work of Solon, in which the clan organization, with its disadvantages, still remained. He divided Attica into three regions—the city coast, and inland, and each of these into ten groups or *Trittyes*.

CLEITOR, CLITOR (37° 54′ N., 22° 7′ E.), town, Arcadia, ancient Greece; celebrated fountain whose waters were said to give a distaste for wine.

CLEMATIS, genus of ranunculaceous shrubby climbing plants; many species; c., with large white or violet flowers, in gardens; *C. Vitalba*, 'Traveler's *Joy*,' is common on light chalky soils.

CLEMENCEAU, GEORGE BENJAMIN EUGENE (1841), a French statesman, *b.* in Chateau de l'Aubraie, Feole, Vendee. He studied medicine and began to practice in Paris, but was compelled to leave the country on account of his Republican sympathies. During 1865-70 he lived in the United States, mostly in Stamford, Conn., where he taught French in a girls' school. After the establishment of the French Republic he returned to France, where he was elected to the Chamber of Deputies in 1876 by the Radicals. In 1893 he became involved in a public scandal relating to the proposed building of the Panama Canal and was obliged to retire from politics. During this period he devoted himself to literature, writing several novels of considerable merit, among these being *Great Pan* and *The Strongest*. His powerful journalistic writings in defense of Dreyfus again brought him into public favor and he was elected to the Chamber, in 1902. In 1906 he became Premier, which position he maintained for three years. During the World War he was, first a member of the Cabinet, then, in 1917, became Premier and Minister of War, being one of the *Big Four* who dictated the peace terms to Germany. In 1920 he retired and devoted a period to travel. In the winter of 1922-3 he came to the United States to arouse American sympathy for France in her attempt to coerce Germany into the payment of the indemnity, but although personally liked, his mission was lacking in success.

CLEMENS, SAMUEL LANGHORNE (MARK TWAIN) (1835-1910), *b.* in Florida, Mo., Nov. 30. His early boyhood was spent in the little town of Hannibal, however, to which the family removed shortly after the boy's birth. His father died when the boy was twelve, and soon after he became a helper and later a compositor in the local printing office. From then till the age of seventeen he wandered over the country as a journeyman printer, going as far as New York. Then he decided to become a Mississippi River pilot. The outbreak of the Civil War ended his career on the river. For a few weeks he was a recruit in a detachment of Confederate volunteers, but this experience ended ingloriously. He then accompanied his brother to Nevada, who had received an appointment as secretary to the governor of that territory. In the West he led a checkered life of many experiences as journalist, prospector, miner and again journalist. He soon began attracting attention by his humorous items and editorials in the various papers for which he worked, and in 1867 he was able to have published his first book, entitled *The Celebrated Jumping Frog of Calaveras.* In that year a San Francisco editor gave him the funds necessary for making the trip on the *Quaker City*, the literary result of which was *Innocents Abroad*, 1869. This book gave him instant fame and popularity. After this trip he lectured successfully and was able to buy an interest in the Buffalo Express, of which paper he was editor during 1869-71. It was then that he married Olivia L. Langdon and settled in what became his permanent home, Hartford, Conn. A publishing venture in which he invested his money failed, and in 1895-6 he made a lecture tour of the world, with the proceeds of which he paid up all his indebtedness. He has written many books, almost all in the humourous vein which gave him his wide popularity, but the best and most enduring of these are undoubtedly those mentioned above and *Tom Sawyer*, 1876; *Roughing It*, 1873; *A Tramp Abroad*, 1880; *Life on the Mississippi*, 1883, and *Huckleberry Finn*, 1885.

CLEMENT, name of fourteen popes and two antipopes: for Clement I., see separate article below. Clement IV., *Guido le Gros* (1265-68), Fr. knight, soldier and advocate; ordained after death of his wife; supported Charles of Anjou against Manfred. Clement V., *Bertrand de Got* (1305-14), abp. of Bordeaux; consented to suppression of Templars at instigation of Philip the Fair of France, 1311. Clement VI., *Pierre Roger* (1342-52), Fr. Benedictine monk; purchased Avignon; patron of art and letters. Clement VII., *Giulio de Medici* (1523-34), Florentine; pronounced against Henry VIII.'s divorce from Catherine, 1534, after long delay, and excommunicated Henry. Rome was sacked by the Germans, 1527. Clement VIII., *Ippolito Aldobrandini* (1592-1605), Florentine; instituted the Forty Hours' Devotion; Giordano Bruno burnt at Rome, 1600, under his authority. Clement IX., *Giulio Rospigliose* (1667-69), Lombard; brought about Peace of Aix-la-Chapelle, 1668. Clement XI., *Giovanni Francesco Albani* (1700-21), Umbrian; organized the Church in the Philippine Islands, and general missionary work. Clement XII., *Lorenzo Corsini* (1730-40), Florentine; elected at 78; issued first papal decree against Freemasons, 1738; though stricken with blindness, an indefatigable worker. Clement XIII., *Carlo della Torre Rezzonico* (1758-69), Venetian; contended against demand of Fr. government for suppression of Jesuits. Clement XIV., *Giovanni Vincenzo Antonio Ganganelli* (1769-74), Franciscan Italian; humble birth; consented to suppression of Jesuits, 1773.

CLEMENT I., SAINT, CLEMENT OF ROME, first pope of whom there is definite historical knowledge, one of the Apostolic Fathers; author of an epistle to the Corinthians; *d.* *c.* 100.

CLEMENT OF ALEXANDRIA, one of the most brilliant of the Gk. Fathers, was head of the Alexandrian school (*q.v.*), *c.* 190-203 A.D.; he wrote a trilogy of connected works: (1) *A Word of Exortation to Greeks* (*i.e.* Gentiles), in which he dwells on the antecedents to Christianity in the better types of heathenism; (2) *The Schoolmaster*, specially directed to those baptized in their youth, and now under the tuition of the Word; (3) *Clothes-bags* (*Stromateis*), a guide to deeper Christian philosophy.

CLEOMENES I., king of Sparta; reigned 520-488 B.C.; won great victory over the Argives; helped Athenians to expel Peisistratidæ; did much to strengthen power of Sparta.

CLEOMENES II., king of Sparta; reigned 370-309 B.C.

CLEOMENES III., king of Sparta; his reign (235-219 B.C.) was of military and political importance.

CLEON (*d.* 422 B.C.), Athenian statesman; headed opposition to Pericles in 430; after Pericles' death became democratic leader; displayed enmity against Athenian nobility and against Sparta; captured Spartans in Sphacteria, 425; killed at Amphipolis.

CLEOPATRA (69-30 B.C.), Queen of Egypt; succeeded her father, Ptolemy Auletes XIII.; fascinated Julius Cæsar and then Mark Antony, at whose death she killed herself by the bite of an asp. A woman of great ability and boundless ambition; of pure Macedonian descent, and therefore no darker than a Greek; had three children by Antony.

CLEOPATRA'S NEEDLE, See OBELISK.

CLERGY, term for ministers as opposed to laity; its singular is 'clerk,' still formally used in ecclesiastical sense.

CLERGY, BENEFIT OF, see BENEFIT OF CLERGY.

CLERK (Lat. *Clericus*), name first given to a person in religious orders; later, included laymen associated with ecclesiastical buildings. In mediæval times the clergy were practically the only persons capable of secretarial work; hence modern use of term in sense of a penman or bookkeeper.

CLERKE, AGNES MARY (1842-1907), Eng. astronomical writer; author of *A Popular History of Astronomy during the XIX. Century* (4th ed., 1902), *The System of the Stars* (2nd ed., 1905), *Modern Astronomy*, 1895; *Modern Cos-*

mogonies, 1906, and numerous other valuable works and articles.

CLERMONT, THE, a boat built by Robert Fulton in New York, being equipped with paddle wheels turned by a steam engine. In 1807 it made the passage from New York up the Hudson to Albany, at the rate of five miles an hour. Though popularly believed to be the first instance of successful steam navigation, the fact is that the Clermont was preceded by a steam paddle boat invented and constructed by John Fitch, of Philadelphia, in 1786, which navigated the Delaware River for six months, carrying passengers.

CLERKENWELL, northern parish in borough of Finsbury, London, Eng.; center of watchmaking and jewelry manufacture. Pop. 88,000.

CLERMONT (49° 25′ N., 2° 20′ E.), town, on R. Breche, Oise, France; interesting mediæval buildings; burned by Eng., 1359 and 1415. Pop. 4,000.

CLERMONT-FERRAND (45° 46′ N., 3° 5′ E.), city, Puy-de-Dôme, France; Roman *Augustonemetum*; formed by union in 1731 of ancient Clermont and Montferrand; bp.'s see; most notable edifices are XIII.-cent. Gothic cathedral; church of Notre-Dame-du-Port, museums of antiquities and natural history; has famous mineral springs. First crusade was declared here by Pope Urban II. at the ecclesiastical council of 1905. Chief manufactures, preserves, semolina, chemicals, rubber goods; important grain market. Pop. 1921, 82,577.

CLERMONT-TONNERRE, Fr. historical family, founded in XI. cent.; many members famous; Gaspard de C.-T. cr. duke and peer of France, 1775.

CLERUCHY, an Athenian colony in a foreign country, where former inhabitants were exterminated, conquered, or given pecuniary compensation; the cleruchs kept their rights as Athenian citizens.

CLEVELAND, BARBARA VILLIERS, DUCHESS OF (1641-1709), Eng. courtesan; wife of Roger Palmer (cr. Earl of Castlemaine) and mistress of Charles II., by whom she was cr. Duchess of C., 1670; a very beautiful, but vicious, woman; by Charles II. she had three sons: Charles Fitzroy, Duke of Southampton, and Cleveland, Henry, Duke of Grafton, George, Duke of Northumberland, and one or two daughters.

CLEVELAND, a city of Ohio, in Cuyahoga co., of which it is the county seat. It is the largest city in the State in population and the first in industrial importance. It occupies both sides of the Cuyahoga River at its mouth, on the south shore of Lake Erie. There is an excellent harbor which gives anchorage for a large number of vessels. The harbor is protected by breakwaters which run out on each side of the river, forming two harbors. The larger part of the city is built on a plateau about 100 feet above the lake. It has a total area of 56.65 sq. miles. It is well laid out and many of the streets, which are wide and well paved, are lined with shade trees. From this is taken the name of the Forest City. The two parts of the city are joined by a stone viaduct which spans the river and valley and is more than 3,000 feet long. There are three other viaducts connecting different parts of the city and form a belt and elevated roadway. Seven railroad lines serve the city. There are several large parks, including Gordon Park, of about 128 acres on the Lake Shore and Wade Park of about 83 acres. The total park and boulevard area is over 2,400 acres. There are many handsome public buildings including the United States building, two county courthouses, city hall, Case Library Building, Case School of Applied Science, and many office buildings. Cleveland has a large commerce. It is the natural seaport of the Lake Superior iron districts and the middle states coal region. Its industries are varied and large. There are nearly 2,500 industrial establishments. The chief industries include the manufacture of steel and iron, foundry and machine shop products, meat packing, clothing, stoves and furnaces, printing and publishing, electrical machinery, manufactures of tobacco, furniture, and patent medicines. Special attention is given to education. There are over 100 public elementary schools, 14 public high schools, 9 junior high schools, and 10 parochial high schools. The institutions of higher education include Western Reserve University, Case School of Applied Science, St. Ignatius' College, Cleveland School of Law, and many schools of art, music and commerce. The first free high school west of the Allegheny Mountains was established here in 1846. There are over 425 churches, many of them housed in beautiful and imposing buildings. Cleveland was settled in 1796 under the direction of General Moses Cleaveland, by people from Connecticut, as the land on which it stood formed a part of the western reserve of the State of Connecticut. In 1805 it became a port of entry. The first steam vessel was built in 1824. The Ohio Canal was opened in 1832. With this the city began to grow rapidly in importance, and this increased after 1860 when the coal and iron industry was developed. The river and the commodious harbor with its situation in regard to coal, iron and petroleum give it a commanding position in respect to trade. Pop. 1920, 796,836.

CLEVELAND, a city of Tennessee, in Bradley co., of which it is the county seat. It is on the Southern railroad. It has important industries including the manufacture of woolen goods, flour, stoves, hosiery, etc. Here is the Centennary Female College. Pop. 1920, 6,522.

CLEVELAND HEIGHTS, a city of Ohio, in Cuyahoga co. It is a suburb of Cleveland. Pop. 1920, 15,236.

CLEVELAND, FREDERICK ALBERT (1865), an American economist, *b.* in Sterling, Ill. Graduating from De Pauw University, in 1890, he studied law and practiced for five years in Chicago. In 1907 he became director of the Bureau of Municipal Research, of New York and Philadelphia, and has served on many U.S. government commissions investigating financial and economic conditions. Among his works are *Growth of Democracy in the United States*, 1898; *Railroad Promotion and Capitalization*, 1912, and *The Budget and Responsible Government*, 1920.

CLEVELAND, STEPHEN GROVER (1837-1908), president of the U.S.; *b.* Caldwell, New Jersey; son of a Presbyterian clergyman; called to the bar of Erie County, New York, 1859. He became assistant district attorney, 1863, and sheriff, 1869, being Democratic candidate and governor of New York, 1882. Cleveland was elected president for 1885-9. He opposed many bills passed by Congress, particularly one which would have enormously swollen the pensions. He next set himself to reform the tariff, and being again nominated for the presidency, he was defeated largely on that issue, and retired till his election again for 1893-7. His term of office was marked by a financial crisis and a dispute with Great Britain. He lived in retirement from 1897 till his death, in Princeton, New Jersey.

CLEVES, KLEVE (51° 47′ N., 6° 9′ E.), town, Rhenish Prussia; formerly capital of duchy of C.; ancient ruined castle of the Schwanenburg, former residence of dukes, is associated with legend,'Knights of the Swan'; warm mineral springs; leather, tobacco. Pop. 17,000.

CLEWS, HENRY (1840-1923), an American banker, *b.* in Staffordshire, Eng. As a youth he studied for the ministry, but coming to New York on a visit with his father, he took a position as a clerk in a business firm in that city. After the panic of 1857 he organized the banking firm of Stout, Clews & Mason. During the Civil War he negotiated the sales of Government bonds for the Federal Government. In 1877 he organized the banking firm of Henry Clews & Co., of which he was the active head until his death. As such he has been one of the most influential figures in the financing of American industries. He was the author of *Twenty-eight Years in Wall Street*, 1885; *The Wall Street Point of View*, 1900; *Fifty Years in Wall Street*, 1908, and *Speeches and Essays*, 1910.

CLICHTOVE, JOSSE VAN (*d.* 1543), Catholic theologian; controversialist of Luther.

CLICHY, CLICHY - LA - GARENNE (48° 55′ N., 2° 19′ E.), town, on Seine, France; chemicals. Pop. 47,000.

CLIFF-DWELLINGS, habitations in New Mexico and Utah, placed in almost inaccessible positions on rock-faces, sometimes hollowed out of limestone; access by removable ladder, or steps hewn in rock; often invisible from ground.

CLIFFORD, Eng. barony; Robert de Clifford summoned to Parliament as baron, 1299; killed at *Bannockburn*, 1314; the barony has now passed out of the original line.

CLIFFORD OF CHUDLEIGH, THOMAS CLIFFORD, 1ST BARON (1630-73), lord treasurer of England; served in navy from 1664; cr. baron, 1672; then lord treasurer; resisted Test Act of 1673, and as a R.C. followed Duke of York into private life.

CLIFTON, a city of New Jersey, in Passaic co. It is on the Erie, and the Delaware, Lackawanna and Western railroads. The city has many important industries including cotton and worsted mills. It is also the center of a large agricultural and fruit growing region. Electricity provides power and lighting. There is also an abundant supply of water power. The city has several handsome buildings. Pop. 1920, 26,470.

CLIFTON FORGE, a city of Virginia, in Allegheny co., on the Chesapeake and Ohio Railroad. Its industries are important and include railway shops, flour mills and machine works. Nearby are valuable deposits of iron and limestone. Pop. 1920, 6,150.

CLIMACTERIC, the period of life of a woman known in medicine as the 'change of life' or the *menopause.* It takes place about the age of 45 to 50, and is marked by the involution and loss of function of the generative organs. The word is also used generally as meaning a critical period.

CLIMATIC CHARTS are maps of sections of the earth's surface on which the various components of climate, such as mean annual temperature, barometric pressure, rainfall, humidity, etc. are indicated. This may be done by coloring the various sections of the chart according to the temperature, pressure, etc., but the more general method is to draw lines on the chart, connecting places whose individual climatic components are the same. Such lines are called *isotherms* if they connect points of equal temperature; *isobars,* if the criterion in question is barometric pressure; *isohyetose,* if the rainfall is being considered; and *isonephelic lines* if they indicate zones of equal cloudiness.

CLIMATE.—It has been known from the earliest times that the atmospheric conditions in different parts of the earth are not the same, and the earth was early divided into zones or belts, each distinguished by certain conditions of temperature, moisture, etc., occupying a particular position with reference to the sun. But when the daily, annual, and monthly variations in the atmosphere are considered these divisions are not satisfactory, for local physical features, mountains, locks, etc., become important. It has been found that each place has a certain series of atmospheric conditions each of which is termed the *weather.* The average weather is termed the *climate* and the study of weather conditions *climatology.* The facts regarding weather are mostly derived from atmosphere. Climatology expresses meteorological data in simpler language so that its facts can be utilized by the farmer, planter, and breeder. Crops, industry, and health depend on climate, and therefore a study of its variations is important.

Climatology records the temperature, moisture, pressure, winds, and evaporation which occur, and considers the regular and irregular variations from the average conditions. The maximum and minimum temperatures, the rainfalls, the frequency, direction, and velocity of winds and the probability of occurrence of any condition are all important matters to agriculturists. The relationships between climate and plants are being most minutely worked out so that the climate can be deducted from the tissues of plants as these show modifications which enable them to withstand heat, cold, drought, ice, and water. Certain diseases are known to be associated with particular weather conditions because certain insects and parasites flourish in these conditions. If the local physical features are altered by drainage the disease vanishes.

Three chief varieties of climate are recognized: *Marine* or *Oceanic,* where the land warms readily and cools readily. The water warms slowly and little, but does not cool easily. This retards the maximum and minimum changes, giving a cool spring, warm autumn, and only slight seasonal changes. The water thus acts as a source of warmth in the winter months. Abundant evaporation from the surface of the ocean causes higher humidity, larger amount of cloudiness, with a heavier rainfall than is found on continents. Climate is equable, damp and cloudy. The air is cleaner and purer and moves more rapidly than over continents.

Desert climate may be regarded as a type of severe continental climate. High winds are common by day, but the nights are calm and cold. Occasional downpours of rain occur on the borders of the desert and may cause flooding. The excessive range of temperature causes the rocks to split up. The wind storms drive the sand against them, and the continual friction polishes them. The plants of the region are peculiarly suited to its climate, having a greatly reduced leaf surface, hairs, very thick skin coated with wax, and various other devices to prevent evaporation.

There are several other recognized types of climate. *Coast* climate is intermediate between ocean and continental. The prevailing winds have a very important effect in controlling it. If they come from the ocean the climate inclines toward the ocean type; if from the shore it is a modification of the continental. There are three seasons in the *Monsoon* climate—one hot, one cold, one wet, during the summer monsoon. In India the winter monsoon blows off shore, the summer one on shore. A monsoon climate also occurs in Eastern Asia. In a *Mountain* or *Plateau* type of climate the height and obstructive effect of the mountains are very important modifying factors. There is a decreased temperature and humidity, and the wind velocity is higher than on the continent. The air is cleaner, purer, and drier. The night temperature is warm because the cold air collects in the valleys below. Uniformity of climatic features distinguishes the *Torrid Zone.* There are no seasons. Life is regulated by the rainfall. There is a high uniform temperature. Periodic phenomena depending on the daily and annual march of the sun predominate. Cyclones are the only events which have an important economic result, for the destruction they work often takes years to repair. They are restricted to certain regions and special times. The *Temperate Zone* is characterized by marked changeableness of weather. The mean temperature and physiological effects are intermediate between those of the Torrid and *Polar Zones*. The weather changes are apparently irregular and haphazard, but they occur fairly systematically. The winds are the important controls. The seasons are classified by temperature. Except the rather meagre data brought back by recent Arctic and Antarctic expeditions, there is no account of Polar climate. It may be said that the temperate regions have provided the most highly developed human societies, probably because the climate has required a more strenuous cultivation of plants and animals. In the Mediterranean area early man must have had not only to clear forests before he sowed and planted, but to bring water to his fields.

CLIMATOLOGY, considered in its broadest sense is a subdivision of Meteorology with which it is to a great extent interdependent. Meteorology is largely theoretical and concerns itself with the physics of the atmosphere, attempting to correlate the physical causes and their effects on climate; while climatology may be described as geographical meteorology and is largely descriptive, having for its object the collection and study of such data as will be of practical service to man. It deals with climate (which is average weather) in contradistinction to weather (which is a single occurrence in a series of conditions which constitute climate). Emphasis is laid on those elements which are most important to life, such as the relation of climate to health (of man and domestic animals), various crops, industries, etc. This necessitates a careful study of temperature (including radiation), barometric pressure, moisture (including precipitation, cloudiness and humidity), evaporation, wind (direction and velocity) and under certain conditions the composition of the atmosphere and its chemical, electric and optical characteristics.

CLIMBING PLANTS are those which, owing to inability to support themselves on their own stems, seek artificial means; hop, ivy, convolvulus are common examples in America, while 'monkey-ropes' and lianes are found all over the tropical world.

CLINCHANT, JUSTIN (1820-81), Fr. soldier; served in Algerian campaigns, 1847-52; in Crimean and Mexican Wars; was general of brigade in Army of Rhine, 1870; surrendered at Metz, but ultimately escaped.

CLINOCLASITE ($(CuOH)_2AsO_4$), mineral occurring in blue-green crystals as a decomposition product of copper ore, in Cornwall, Devon, Saxony, Utah.

CLINOMETER, apparatus for gauging angle or slope of surface; consists of graduated arc with pendulum; sometimes compass-attachment is used by geologists.

CLINTON, a city of Illinois, in De Witt co., of which it is the county seat. It is on several important lines of railway. Its industries include bridge works and iron works. Pop. 1920, 5,898.

CLINTON, a city of Indiana, in Vermilion co. It is on several important lines of railway and on the Wabash river. In the vicinity are important coal mines. Pop. 1920, 10,962.

CLINTON, a city of Iowa, in Clinton co., of which it is the county seat. It is on the Chicago Northwestern, the Chicago, Milwaukee and St. Paul, and other railroads, and on the Mississippi river, 60 miles southeast of Dubuque. It is a trade center for a large area and its manufacturing interests are important. Several bridges cross the Mississippi river at this point. The city is the seat of Wartburg College and has public schools, churches, newspapers, banks, etc. Pop. 1920, 24,151.

CLINTON, a town of Massachusetts, in Worcester co. It is on the Boston and Maine, the New York, New Haven and Hartford railroads, and on the Nashua river, 40 miles west of Boston. The industries of the city are important and include cotton and carpet mills. Abundant power is derived from the river. Clinton is connected with near-by towns by electric railways. It has a public library, a graded school system, many churches, a bank, etc. Pop. 1920, 12,979.

CLINTON, a city of Missouri, in Henry co., of which it is the county seat. Its industries include flour mills and iron works. Pop. 1920, 5,098.

CLINTON, DE WITT (1769-1828), Amer. politician; admitted to bar, 1790; private sec. to his uncle, leader of the Republican party; became member of New York Assembly, of U.S. Senate; mayor of New York, and governor of the state of New York; opposed slavery, championed education, pressed forward Erie canal scheme, and ultimately opened canal.

CLINTON, GEORGE (1739-1812), first governor of New York and a Vice-

President of the United States, *b.* in Little Britain, N. Y. After serving as a lieutenant in the French and Indian War, he began to practice law, but again went into the army during the Revolution, achieving the rank of brigadier-general. He was the first governor of New York, in which capacity he served continuously for eighteen years. In 1804 he was elected Vice-President of the United States, which position he held till his death.

CLINTON, SIR HENRY (*c.* 1738-95), Brit. soldier; fought in Seven Years War and in Amer. War; gov. of Gibraltar, 1794.

CLINTON, JAMES (1736-1812), a soldier of the American Revolution, the brother of George and the father of De Witt Clinton, *b.* in Little Britain, N. Y. He accompanied Montgomery to Quebec, during the war against the French, in 1775. During the Revolution he held a commission as colonel in the Continental Army, later becoming a brigadier-general. He was in command of Fort Clinton, when captured by the British, on which occasion he was severely wounded. In 1779 he served under Sullivan against the Indians. He was present at the surrender of Cornwallis.

CLINTONITE, BRITTLE MICAS, groups of minerals between micas and chlorites, containing less silica than the former (and no alkalis) and less water than the latter; include margatite, chloritoid, xanthophyllite, brandisite, seibertite.

CLIPPER, See SHIP.

CLIO, the first of the nine muses, who presided over history, and is represented as crowned with laurels, holding a book in one hand, and in the other a trumpet.

CLIO, a genus of naked marine gastropod molluscs in the family Cavoliniidæ, belong to the division Pteropoda, or wing-footed molluscs—so called because they are constructed for moving through water by means of fin-like membranes which are lateral expansions of the foot. *C. Borealis*, about an inch in length, is a species which abounds in N. seas and constitutes a great portion of the food of the Greenland whale; *C. Australis* is a native of the cold latitudes of the S. Ocean.

CLISSON, OLIVER DE (1336-1407), Fr. soldier; fought under Bertrand du Guesclin in campaigns against English, and succ. him as Constable of France, 1380; acquired vast wealth and power.

CLITOMACHUS (II. cent. B.C.), Gk. philosopher.

CLITUMNUS (42° 45′ N., 12° 43′ E.), small river, Unbria, Italy; enters Tinia, a tributary of Tiber.

CLIVE, KITTY (1711-85), Eng. comic actress; acted under Cibber and Garrick at Drury Lane; friend of Horace Walpole.

CLIVE, ROBERT CLIVE, BARON (1725-74), Brit. statesman and general; *b.* at Styche, Shropshire, Sep. 29. At school he was unruly, and in consequence was sent to India in 1743. C. went by way of Brazil, where he learned Portuguese, reaching Madras in 1744. He entered the army in 1747, and after various small actions he won great distinction at the siege of Arcot in 1751. C. had been in England for three years, and returned as gov. of Fort St. David. Then occurred the famous incident of the Black Hole of Calcutta. C. defeated the Nawab's troops, and, after several months spent in negotiations, he won the great victory of Plassey, June, 1757. He followed this up by other victories, and established Brit. supremacy in Bengal. He returned to England in 1760, and was cr. baron in 1762. He sailed again for India in 1765, and in less than two years accomplished much in the civil administration of India. His health obliged him to return to England, and there violent attacks were made on his public administration and his private character. He defended himself vigorously, but morbid depression overcame him and he committed suicide.

CLOACA, Roman sewer; *Cloaca Maxima* (VI. cent. B.C.), is famous.

CLOCK, instrument for measuring time, and showing on a dial hours, minutes, and sometimes also seconds. The earliest time-measurer was undoubtedly some form of sundial, in which the progress of the sun was registered by a shadow thrown upon a graduated plate. The sundial was followed by the Clepsydra, or water-clock, which measured the hours by the quantity of water discharged through a small hole in the containing vessel. The sand-glass worked on the same principle, sand or powdered eggshells taking the place of water, as in the familiar egg-boiler. The date of the invention of the clock proper is very uncertain, for the references to the early instruments of Boethius, Pacificus, and others are so vague as to leave it doubtful whether they were wheel-and-weight clocks or some form of water-clock.

The earliest clock of which we have a full description was made in 1379 by a German named Henry de Wyck, and erected in Paris for Charles V. In this clock a cylinder was set in motion round its axis by the uncoiling of a cord carrying a weight, this motion being successively communicated to a series of toothed wheels, ending in the escapement wheel. The teeth of the escapement wheel acted upon two small levers called pallets, which projected from and formed part of an upright spindle on which was fixed the regulating balance. The cylinder also set in motion a wheel to which was attached the hands of the clock. The balance was loaded with two weights, which resisted the unwinding of the cord, and the clock was regulated by increasing or decreasing the distance of the wights from the spindle. This construction formed the basis of practically all clocks up to the application of the pendulum as a regulating power, which was accomplished by Huygens about 1657. The value of the pendulum as a regulating power lies in the fact that its oscillationsall take substantially the same time, and after this date all clocks with any pretensions to accuracy were fitted with a pendulum. The accuracy of a pendulum as a regulator depends upon its being always the same length, and with the simple pendulum serious errors arise from its expansion or contraction with variations in temperature. To obviate this defect, compensating pendulums were constructed, the most important being the 'gridiron' and the 'mercurial' pendulums. The 'gridiron' pendulum, invented by Harrison in 1726, is made of alternate bars of two different metals. When heated, one set expands upwards and the other downwards, and the length of the bars are so proportioned that one expansion exactly counteracts the other. In Graham's 'mercurial' pendulum, invented 1715, the bob consists of a glass cylinder containing mercury. When a rise in temperature causes the metal rod to lengthen, the mercury simultaneously expands upwards, thus raising the center of inertia and counteracting the lengthening of the rod.

Other great improvements upon Huygens' clock were made, notably the escapement, or mechanism which transforms the rotary wheel motion into the oscillatory motion of the pendulum. Huygens' clock required a light pendulum and large arcs of oscillation, and an improved arrangement, known as the 'crutch' or 'anchor' escapement, was invented by Hooke about 1666. This device allowed of a much heavier pendulum with smaller arcs of oscillation, and is still largely used. Early in the XVIII. cent. an improved form known as the 'dead beat' escapement was made by Graham. This gives greater accuracy than the 'crutch' escapement, by obviating any recoil. Other escapements have been invented to remedy small errors in the previous forms, but these are used mainly in clocks for special purposes where absolute accuracy is required. In small portable clocks and watches, where the motive-power is a mainspring, the motion is chiefly regulated by the escapement and balance-wheel, the gradual weakening of the motive force as the spring uncoils being adjusted by a contrivance called the 'fusee.' The balance-wheel is compensated for variations in temperature on the principle of the 'gridiron' pendulum. Various modifications of the escapement, in spring clocks and watches have been introduced, amongst which may be mentioned the 'lever' escapement and the 'detached' escapements which are used in chronometers.

CLODD, EDWARD (1840), Eng. writer on folk-lore, myth, evolution, etc.; twice president of the Folk-lore Soc.; friend of George Meredith; has written *Childhood of the World*, *Myths and Dreams*, *Story of Primitive Nan*, *Story of the Alphabet*, and *Animism*.

CLODIUS, PUBLIUS (*c.* 93-52 B.C.), Rom. politician; won notoriety for penetrating into mysteries of 'Bona Dea'; secured banishment of Cicero; became a demagogue; killed in brawl with Milo.

CLOISONNE, See **ENAMEL.**

CLOISTER was originally the general name for an entire conventual building, and in this sense is frequent in Eng. lit. Later applied to the covered ambulatory, the roof of which was supported upon pillars and open arches, surrounding the quadrangle of a monastery, and here many of the duties of a religious house were carried on, (*e.g.*) copying and illuminating manuscripts, training novices, etc. The cloisters of many Eng. cathedrals are still in a perfect state of preservation, one of the finest examples being Gloucester; they are also to be seen at Eton and Winchester Schools, and in some of the Oxford Colleges.

CLONMEL (52° 22′ N., 7° 41′ W.), market town, on Suir, County Tipperary, Ireland; besieged by Cromwell, 1650; birthplace of Sterne; has flour mills and breweries; exports grain, cattle, butter. Pop. 10,000.

CLOOTS, JEAN BAPTISTE DU VAL DE GRACE, BARON VON (1755-94), Fr. Revolutionist, known as Anacharsis Cloots; violent anti-Christian; member of convention, 1792; guillotined through Robispierre's influence.

CLOQUET, a city of Minnesota, in Carlton co. It is on the Northern Pacific, the Great Northern and other railroads and on the St. Louis river. It is the center of an important lumber region and its industries include the manufacture of paper, boxes, etc. Pop. 1920, 5,127.

CLOSE, MAXWELL HENRY (1822-1903), Irish clergyman and geologist; leading authority on glacial geol. of Ireland; pres. of Royal Geological Soc. of Ireland, 1878.

CLOSURE or **CLOTURE,** expedient for facilitating parliamentary business; any member may move c., which means that division be taken forthwith; introduced into Fr. Chamber, 1882, and House of Commons, 1885, where it has been used systematically since 1911, proceedings being automatically stopped at stated time. The device is seldom used in American legislative bodies, though a modified form exists in the United States Senate. It is, however, rarely invoked.

CLOTAIRE, name of four Frankish kings; Clotaire I., *d.* 561, *s.* of Clovis; king of Soissons, 511; of all Gaul, 558; also of part of Germany. Clotaire II., *d.* 629, king, 584; Clotaire III., king, 657-73; Clotaire IV., king of Austrasia, 717-19.

CLOTH. See TEXTILES.

CLOTHING. See COSTUME.

CLOTILDA, ST. (*d.* 544), dau. of Chilperic, king of Burgundy; *m.* Clovis, king of Franks, whom she helped convert to Christianity.

CLOUD, an elevated mist formed by the condensation of aqueous vapor in the air. Several classifications have been brought forward, the following being established by an international committee in 1896: A. Upper clouds, average altitude, 9000 metres; (1) cirrus; (2) cirrostratus. B. Intermediate c., 3,000-7000 m.; (3) cirrocumulus; (4) altocumulus; (5) altostratus. C. Lower c., 2000 m.; (6) strato-cumulus; (7) nimbus. D. Clouds of diurnal ascending currents; (8) cumulus, 1400-1800 m.; (9) cumulonimbus, 1400-3000 or 8000 m. E. High fogs under 1000 m.; (10) stratus.

CLOUD, VIRGINIA WOODWARD Unmarried; was educated at private schools in Baltimore. Began writing in 1893. Was literary editor of the Baltimore News from 1906-14. She wrote the music and words of several songs, critical articles, stories and poems in leading magazines and was the author of: *A Woman, a Spaniard and a Walnut Tree, The Other Thing, From a Little Red Birthright* and other noveletts, also *The Witch, The Ballad of Sweet P* and *The Matrimonial Opportunities of Maria Pratt* (used by impersonators) and nineteen connected tales of Colonial and Revolutionary periods.

CLOUDBERRY (*Rubus Chamoemorus*), a kind of raspberry, bearing large white flowers and orange-yellow edible fruit grows in N. temperate regions.

CLOUDED TIGER, CLOUDED LEOPARD (*Felis macroscelis*), member of cat family living in forests of the E. Indies and S. Asia; the greyish-brown body, up to 4 ft. in length, marked with stripes, rings, and spots.

CLOUET, FRANÇOIS (*d.* 1572), Fr. miniature artist; *s.* of Jean C.; was a painter of eminence, and executed portraits of Henri II., Mary of Scots, and other notables.

CLOUET, JEAN (*d.* 1541), Fr. miniature artist.

CLOUGH, ANNE JEMIMA (1820-92), Eng. educationist; became associated with school started at Cambridge, 1871, which developed into the famous Newnham College, 1880, of which Miss C. became the first principal.

CLOUGH, ARTHUR HUGH (1819-61), Eng. poet, *b.* Liverpool. He was made a fellow of Oriel, but resigned in 1848, owing to religious difficulties. In this year he pub. his most famous poem, *The Bothie of Tober-na-Vuolich,* the description of an Oxford reading-party in the Highlands, written in hexameter verse.

CLOVELLY (51° N., 4° 24′ W.), fishing village, N. coast of Devonshire, England; on cliff 400 ft. high.

CLOVER (*Trefolium*), leguminous plant embracing about 300 species, with characteristic leaf with three leaflets trefoil, important for pasturage and fodder. As a crop (*q.v.*) plant it occupies the third year in the four-course rotation, white c. (*T. repens*), red c. (*T. pratense*), crimson c. (*T. incarnatum*), and alsike (*T. hybridum*) being a few of the more important species. The medick and lucerne (*Medicago*) are closely allied.

CLOVES, the dried flower-buds of the tropical tree *Caryophyllus aromaticus* (order Mytacea), cultivated in the Moluccas, Java, Sumatra, Zanzibar, and the W. Indies; used as a spice and for preparation of the aromatic and pungent essential of oil of cloves.

CLOVIS (*c.* 466-511), Frankish king; succ. his *f.*, Childeric I., as king of the Salian Franks, 481; defeated Rom. general Syagrius, 486; *m.* Christian Burgundian princess Clotilde, 493; conquered Alemanni, baptized a Christian, 496: defeated Visigoths, became champion of orthodox faith against Arians, and king of all the Franks.

CLOYNE (51° 52′ N., 8° 7′ W.), market town, County Cork, Ireland; seat of R.C. bp.; Prot. see founded by St. Colman, VI. cent., but united to Cork, 1835; has XIV.-cent. cathedral.

CLUB, the name given to an assembly of persons who meet together for the promotion of some common object of interest; also to the building in which such meetings are held. C's existed amongst the ancient Greeks and Romans, the members of which used to share meals, and perhaps the most notable were the religious c.'s whose members were pledged to make sacrifice to some particular deity. The earliest known Eng. c. was called 'La Court de Bone Compaignie' in the reign of Henry IV. The poet Occleve was a member. Not until the reign of Elizabeth did the literary or convivial c. become an established institution. The most famous c. of this period was that established by Sir. Walter Raleigh at the Mermaid Tavern, of which Shakespeare and most of the other poets and dramatists of the age were members. Ben Jonson founded a similar c. at the Devil Tavern. The next great period of Eng. club-life came into existence with the development of the coffee-houses in the XVIII. cent. Prominent amongst the c's of this period were White's, 1698, Brook's, 1764; Boodle's, 1762; and The Cocoa Tree, 1746. The famous Literary Club was founded by Dr. Johnson in 1764.

CLUB-FOOT, TALIPES, a general name including several types of deformities of the foot; *talipes equinovarus* is the commonest form, in which the heel is slightly elevated, the foot inverted, and the person walks on the outer border; *talipes equinus*, in which the heel is drawn up, and the person walks on the heads of the metatarsal bones; *talipes calcaneus*, in which the front of the foot is drawn up, and the person walks on the heel; *talipes valgus*, in which the foot is everted and the person walks on the inner border; *pes cavus*, in which the arch of the instep is greatly exaggerated. There may be combinations of several of these. Talipes may either be congenital, due to faulty development of one or other of the bones at the heel, or acquired, due usually to infantile paralysis. The treatment is persistent care and manipulation, begun as early as possible; operation may be necessary.

CLUNY, CLUGNY (46° 26′ N., 4° 39′ E.) town, Saône-et-Loire, France; formerly seat of celebrated Benedictine abbey, remains of which are Abbot's Palace and ruins of Abbey Church, begun 1089, C. has also two old churches of XII. and XIII. cent's. Pop. *c.* 4,100. The Cluniacs were a subdivision of Benedictine Order founded here in X. cent.; they eventually had large number of houses, variously estimated at from under 400 to over 2,000. At time of suppression of monasteries number had decreased to 32.

CLUSIUM (43° N., 11° 54′ E.), town, Siena, Italy; near site of modern Chiusi; ancient capital of Etruria; many sepulchral remains, and some underground passages; several thousand Etruscan inscriptions in district; in museum of antiquities are Etruscan and Gk. vases, etc.; declined after Italy was invaded by barbarians.

CLUTCH. See Automobile.

CLYDE, river, W. of Scotland; rises in S. borders of Lanarkshire; enters Firth of C. at Dumbarton, 106 miles; navigable for liners, up to Glasgow; of great commercial importance and principal shipbuilding center in world; has four celebrated falls, near Lanark, where river descends about 250 ft. in few miles; upper valley famous for 'Clydesdale' horses; orchards; iron and coal fields.

CLYDE, LORD. See Sir Colin Campbell.

CLYDEBANK (55° 54′ N., 4° 12′ W.), town, on Clyde, Dumbartonshire, Scotland; ship building; sewing machine works. Pop. 38,000.

CNIDUS (36° 40′ N., 27° 30′ E.), ancient ruined city, on coast of Caria, Asia Minor; modern Tekir; scene of naval victory of Persians over Spartans, 394 B.C.

CNOSSUS, GNOSSUS, KNOSSUS (*c.* 35° 18′ N., 25° 5′ W.), ancient city, Crete, on Cæratus; reputed capital of King Minos; colonized by Dorians; afterwards became Rom. colony; vicinity associated with numerous Gk. legends; since 1900 site of important excavations.

COACHING, favorite mode of traveling from XVII. to early XIX. cent.; first mail-coach between London and Bristol, 1784; rendered dangerous by highway men, Hounslow Heath, favorite waylaying-ground.

COAHUILA (27° 45′ N., 101° 45′ W.), northern state, Mexico, bordering Texas; rich in minerals; large crops of cotton, Ind. corn; silver and gold mining; area, 62,375 sq. miles. Pop. 377,000.

COAL, a mineral substance of great utility on account of its combustible qualities. Apparently its use was not known to the ancient world. So far as known it was first used as fuel in England in the 13th cent., but substantial demand for it only developed with the introduction of steam-driven machinery into industry. It seems doubtful, in fact, whether our present system of manufacturing could have evolved without coal as fuel. Coal was undoubtedly formed millions of years ago, during what is termed the carboniferous era of the earth's development, through the partial decay of vegetable and some animal matter. It is believed that where the coal beds are now found there existed vast areas of luxuriant growth of plants and trees now largely extinct. Where such jungles have grown on dry soil the result has been, after thousands of years, only a few inches of friable soil. But most of the forests of the carboniferous epoch grew in swampy soil, the fallen trunks or branches or leaves being covered with water, thus checking the complete disintegration and altering the chemical proportions of the constituent elements of the residium, the most predominant of which was carbon. Occasionally a great flood would cover this strata of partially decomposed vegetable matter, adding pressure as another of the elements in the formation of the future coal bed. The vast duration of this geological epoch is indicated by the fact that in some coal fields, as in Edinburgh, Scotland, more than 100 seams of coal have been found, one above the other, each representing hundreds or perhaps thousands of years of forest growth, the whole depth of the strata being over 6,000 feet, and the combined thickness of the coal seams being over 200 feet. The intervening rock stratas usually consist of sandstone, shale, and less frequently, limestone. In some coal fields these layers are so confused and intermixed that it is impossible to subdivide the strata in the order of time. These seams abound in the fossil remains of vegetable and animal life, several hundreds of species being found in Great Britain alone. The most remarkable of these fossil remains are those of the fishes, which seem to have flourished in the shallow waters of the forest swamps in great abundance. Coal, as mined today, may be divided into four distinct kinds; cannel, lignite, anthracite and bituminous, the latter being by far the most plentiful. These merge into each other, forming other subgrades, such as semi-bituminous and semi-anthracite. Of the four, cannel coal stands out most distinctly, being so different from the other as to give grounds to the theory that it is of distinct origin, being probably the remains of animal forms rather than vegetable matter. It is sometimes of a dull brown, does not soil the fingers in handling, lights easily and is therefore mostly used for open grates. It is also valuable in the manufacture of gas, a ton sometimes producing as much as 15,000 cubic feet of illuminating gas. In the United States it is found only in limited districts, principally in Cannelburg, Ind., and in the Jellico district, Ky. Lignite, the lowest of the four grades as a fuel, is brownish in color, and by its texture shows imperfect transformation, woody fibres, and even the remains of leaves and branches being plainly indicated. Some is so buoyant as to float in water. It burns easily but is only suitable for domestic use. It is found in wide areas but not in great quantities. Anthracite, or hard coal, is of a firmer and more solid texture, a glossy black, so solid that it is turned on lathes and made into vases or candle holders or inkstands, resembling jet. In this country most of it is found in eastern Pennsylvania, and the greater portion of it is used for domestic purposes. Most of the coal mined is bituminous, or soft coal, which is usually of a dull black, shatters easily into irregular square lumps, and burns easily. This is used almost entirely in the big industries. Certain grades of bituminous cakes are baked in a closed oven, thus forming coke, and to this purpose a great portion of the bituminous coal mined is devoted. It is also used for the production of illuminating gas. In relation to the general uses of coal some mention should be made of the numerous by-products. Coal, as used in making gas, also yields a watery ammoniacal liquor and tar which pass over in the form of a vapor, which is condensed, leaving coke in the retorts. The coal tar is distilled and yields per ton of coal about five gallons of ammoniacal liquor, six gallons of crude naphtha, 26 gallons of light oil, 17 gallons of creosote oil, 38 gallons of anthracene oils and a large quantity of pitch left behind in the retort. This latter is equal to about 60 per cent. of the whole tar which is said to contain about 200 different compounds. From the above mentioned by-products are manufactured many explosives, drugs and disinfectants. Anthracene is used in the manufacture of analine colors, employed extensively in the textile industries. Coal is found in practically all countries, but The United States stands first as the greatest coal producing country. The known coal fields in this country cover an area of over

300,000 square miles. These fields may be roughly divided into several main regions; first, the Appalachian, which includes parts of Pennsylvania, Ohio, West Virginia, Virginia, Maryland, eastern Kentucky, eastern Tennessee, Georgia, North Carolina and Alabama. This region is about 750 miles in length and averages 80 miles in width. This area produces bituminous coal, except for about 500 square miles in the north-eastern end, covering Pennsylvania, which includes the anthracite producing field. The second important region is what may be called the Eastern Interior, which includes western Kentucky, Indiana and chiefly Illinois. This is the great bituminous coal field. The West Central region comes next, taking in Iowa, Missouri, Arkansas, Oklahoma, Kansas and a part of Texas. This region also produces bituminous coal exclusively. A smaller region takes in the lower peninsula of Michigan, being a circular basin of about fifty miles in diameter, also producing bituminous coal. The Rocky Mountain region is the most scattered, taking in all the states impinging on the Rockies: New Mexico, Colorado, Utah, Wyoming, North Dakota, Montana. Here all varieties are found, though bituminous still predominates. There are also some coal fields along the Pacific coast, taking in California, Oregon, Washington, and of potential importance, Alaska. The coal found along the coast within the United States proper is not of good quality and is largely devoted to home use, California and Oregon also importing coal from Australia. The mining of coal forms one of the big industries of the country. The number of men engaged varies, naturally, not only from year to year, but from month to month, activities being very unsteady. In 1914 the men employed ranged as high as 180,000, dropping to 154,000 in 1918, each man producing a little over two tons a day. In the bituminous mines there were 615,000 men employed in 1918, each man producing almost four tons a day. In 1919 there were 8,655 mines in active operation, of which 374 were anthracite mines, all representing a total investment of over $2,338,000,000. The great bulk of the coal is mined by the sinking of shafts, or slopes or the boring of tunnels into mountain sides. But a large quantity is also produced through a process known as 'stripping.' in cases where the coal seam lies very near the surface, steam shovels are used in removing the top layer of earth or rock, and then the coal is dug out as in any excavating operation. Usually, however, the coal seam is too deep below the surface to make this method profitable, and then shafts are sunk. Where the coal lies very deep, one shaft with several compartments is sunk. A shaft near Wilkes-Barre, Pa., is 1,040 feet deep, being 12 feet by 52 feet in size and contains five compartments, each compartment being used as though it were a separate shaft. Where the depth is less it is more profitable to sink a number of shafts widely apart, to save hauling down in the mine. There are two distinct methods by which the actual mining of the coal is done in the mine. One is known as the 'room and pillar system.' By this method the miners excavate the seam, leaving the rock ceiling well pillared behind them, as they progress. The second method is known as the 'long wall system.' Here the whole face of the seam is excavated and the ceiling is allowed to drop as the mining progresses, an encasing tunnel only being maintained through the fallen rock, through which the coal may be transported back to the bottom of the shaft. In some of the larger mines the coal is brought to the bottom of the shaft by small railroad trains traveling back and forth along the passages, driven by electricity. In the more advanced passages where the traffic is not yet so heavy, the coal is dragged in cars by mules, which are sometimes kept down in the mines for months and even a year at a time. A coal mine differs from other mines in the great precautions that must be taken to insure ventilation. The greatest danger is from marsh gas, which, when mixing with air in certain proportions, causes fire damp, highly explosive. Other dangerous gases are carbonic acid gas, known as black damp, sulphurated hydrogen, known as stink damp, and carbon monoxide, known as white damp. Coal dust is also highly explosive. The most feared danger is from 'after damp,' a gas which follows explosions and is very likely to cause further explosions, the deeper the mines the greater the danger of explosions, and for this reason the European mines, which have been sunk to a greater depth than those in this country, are more dangerous. Thirty years ago most of the mining was done by manual labor, with pick and shovel. During the past twenty years, however, machinery has been gradually displacing manual labor. In 1903 machinery was used in mining only one-fourth of the output of bituminous coal. In 1910 40 per cent. was so mined, and today fully 90 per cent. is mined largely with machinery. The two machines mostly in use in American mines are the pick machine and the chain cutter machine, worked with electricity or compressed air. The pick machine is somewhat like a rock drill, while the chain cutter is a machine mounted on a low bed or metal frame, being a motor which moves a rotating chain to which cutting teeth are attached. These machines vary in size, the smaller ones being shoved ahead of the miners into small openings, in which they operate. The yearly coal production of the world is estimated at slightly under 1,500,000,000 short tons, of which about 600,000,000, or over a third, is mined in the United States, Great Britain following with about 325,000,000 tons and Germany with 300,000,000 tons. Then follow in their order of quantity; the countries which formerly constituted Austria-Hungary, 65,000,000; France, 50,000,000; Russia, 40,000,000; Belgium, 25,000,000; Japan, 30,000,000; China, 20,000,000; India, 20,000,000; Canada, 15,000,000; New South Wales, Australia, 12,000,000; Spain, 7,000,000, and smaller amounts in Holland, Chile, Mexico, Turkey, Sweden, Italy, Serbia and Bulgaria. These figures apply only to the normal conditions just before the war; since then there has been a sharp decline in the coal mined throughout all these countries. In 1921 the United States produced 80,780,000 tons of anthracite, which was about the same as in 1914. But in the same year only a little over 363,000,000 tons of bituminous coal was mined, as compared to over 427,000,000 tons mined in 1913. The great coal strike of 1922, of course, reduced the output of that year to abnormally low figures, but 1923 promises on the other hand to show abnormally big figures in production.

COALDALE, a borough of Pennsylvania, in Scuylkill co. It is on the Lehigh and the Central of New Jersey railroads. It is surrounded by an important coal mining region. Pop. 1920, 6,336.

COAL-FISH (*Pollachius carbonarius*), edible fish of the family Gadidœ, found on European and American coasts of North Atlantic Ocean.

COAL GAS is produced by the destructive distillation of bituminous coal by heat. The process forces the coal to discharge its gaseous constituents, and the resulting solid carbon and ash, thus drained of volatile matter, is coke. Good gas coal is mined in the Pittsburgh, West Virginia and Kanawha fields, as well as in Tennessee and Colorado. The coal is distilled in closed retorts, or long semi-cylindrical pipes, furnace heated. The retorts are of fireclay, either oval or D-shaped or square in section and are set horizontally or inclined. They are grouped in 'benches' six to twelve in number, and treated by gas from a producer furnace installed under them, sometimes below floor level. Coal is charged into the retorts and a temperature of about 1,400° F. is maintained for four or fivet hours, during which time a certain proportion of cubic feet of gas is extracted per pound of coal, the retort lid opened, and the coke raked out and quenched with water. In the process the gas is drawn from the retort through a pipe to the hydraulic main, from which steam draws it to a condenser, where the coal tar and other impurities are condensed and fall into underlying watertanks, while the gas passes on to the scrubber. Here the gas goes upward through the coke which it contains, gets saturated with water and sprinkled, whereby ammonia and other impurities are removed. The gas next passes through a series of purifier boxes, gets in contact with a mixture of lime and water and is agitated by mechanical means. Finally it passes by a pipe into the gas holder and is drawn off to the mains laid under the streets and through service pipes that connect the mains with the gas consumer's premises and meter, and thence to the gas lighting appliances. The extraction of gas from coal and its use for illuminating purposes dates from the latter part of the XVIII. cent. See COKE.

COAL-TAR. The importance of this substance was realized only when Faraday discovered benzene and Perkin isolated the first aniline dye, mauve. When coal is heated beyond its decomposition point without access of air (destructive distillation), three products are obtained: (*a*) dried residue, (*b*) evolved gases, (*c*) condensed distillate. The last separates into two layers: (1) holds a small portion of the distillate in solution, and consists of water either previously existing in the coal or produced during the destructive distillation; (2) a viscid, dark-colored oil, sometimes heavier, sometimes lighter than (1). This is coal-tar. Its quality and quantity are influenced by the temperature at which the decomposition is carried on. At low temperatures the hydro-carbons produced are mostly fatty, at high temperatures aromatic. The quality of the coal and the shape of the gas retorts are other factors which alter the nature of the products, since if the gas retort is so shaped that the gases are kept in contact with the hot walls much decomposition results.

Coal-tar is a complex mixture yielding on distillation benzene, toluene, phenol, creosote, etc. It is employed as a coating for preserving stone, iron, and timber. Mixed with dry lime and clay, it forms asphalt for paving. The coal-tar industry is classified as a 'key industry,' for dyes, drugs, explosives, are all made from its primary derivatives.

COALVILLE (52° 46′ N., 1° 7′ W.), town, Leicestershire, England; coal mines. Pop. 19,000.

COAST AND GEODETIC SURVEY, UNITED STATES, a service of the Federal government devoted to surveying and charting the coasts of the United States and its outlying possessions. The surveying of coasts and adjoining waters is a task which every maritime nation has assumed for at least two centuries past, primarily for the purpose of facilitating and rendering less dangerous its shipping. The importance of this service to the United States may be judged by the fact that the general coast line of the country itself is over 10,000 miles in length, and that of the colonial possessions even greater. It was President Thomas Jefferson who gave the first impulse to the establishment of such a service by recommending it to Congress, in 1807. It was then placed under the charge of the Secretary of the Treasury, the actual work of surveying and making soundings and the preparation of charts being done by naval and military officers. Since 1898 all the work has devolved on a special service, the officers of which are experienced hydrographic engineers. The actual field work consists largely in taking soundings of the waters along the coast and surveying the land along the waterline within a strip from three to five miles wide. With this material the office in Washington prepares general charts, harbor charts, tide tables, current tables and special publications giving instructions to navigators and pilots. In July, 1922, the service reported that the complete survey of the two continental coasts had been about half accomplished, that of the Philippines was nearly completed, the work along the Alaska coast was about one-third done, and that about three years work was still needed in Hawaii, Porto Rico and the Virgin Islands.

COAST ARTILLERY, the guns and corps serving the guns which are assigned to the protection of the coast against foreign naval attack. In 1895 the United States Board of Ordnance and Fortifications estimated that at the rate of progress then being made, another fifty years would be required to cover all possible danger points along both coasts. After the Spanish-American War, and especially since the World War, this work has progressed at a faster rate. Now all the chief harbors and most important points where landings could possibly be made have been more or less covered with heavy guns, not only in the United States proper, but in the outlying possessions. Both ends of the Panama Canal have been especially well fortified. There is at least one 16 inch gun in the defensive system of every harbor or point of strategic importance. It is estimated that the guns already placed protect government and private property to the value of about five billion dollars. The guns used are generally of large calibre, of powerful, flat trajectory, for piercing the armor plate sides of enemy vessels, and huge mortars or howitzers, for the purpose of dropping shells on the decks of approaching vessels. These guns are manned by the Coast Artillery Corps of the regular army and a coast artillery militia as a complementary body to be called upon in time of war. These again are supported by mobile forces of infantry to be called upon for the protection of local fortifications in time of need. The coasts are divided into districts, as follows: the First, headquarters in Boston; the Second, with headquarters on Governor's Island, New York; the Third, with headquarters in Baltimore, Md.; the Fourth, with headquarters in Fort McPherson, Ga.; the Ninth, with headquarters in San Francisco, Cal.; the Panama District, with headquarters at Fort Amador, Canal Zone; and the Hawaiian, with headquarters in Honolulu.

COAST DEFENSE, covering all those military and naval preparations made for the protection of the country against a possible foreign invasion from the sea. The distinction between 'coast defenses' and coast defense must be emphasized, the former being only those works established at strategic points along the coast, usually overlooking possible landing places and harbors, while the latter usually includes a large part of the naval establishment as well. It is usually the heavier vessels, such as those of the monitor type, and the lighter vessels, such as submarines, torpedo boats, torpedo boat chasers, etc., which are devoted to the coast defense service. It is seldom that one of these vessels is assigned to general or overseas service, as was done during the Spanish-American War, when the monitor 'Monadnac' was sent across the Pacific to the Philippines. Besides vessels of war, coast defense also includes systems of submarine mines and other methods of obstructing approaches to landing places and harbors. A portion of the army may also be assigned to that service, including not only artillery, but infantry and cavalry, in the form of mobile reserves which may be gathered to repel landings. In Great Britain the supreme responsibility for coast defense devolves on the naval authorities, while in Germany before the World War the army was responsible. In the United States the army and navy are jointly responsible, in several major divisions, under a chief of staff.

COASTGUARD, naval force formed to suppress smuggling; used also as naval reserve and to assist shipwrecked vessels.

COAST RANGES, a system of mountains in N. America extending along British Columbia, Washington, Oregon, and California, and almost parallel to the Pacific coast. These mountains are very irregular, sometimes attaining to a great height and then remaining at a comparatively low one for a considerable distance. The character of the scenery is also very varied, the mountains in some places being almost bare, and in other places being densely covered with thick forests of trees. In British Columbia the C.R., called also Cascade Range, average a height of from 6,000 to 7,000 ft., although some peaks attain to a height of 9,000 ft. Many of the trees on the slopes of the C.R. grow to an enormous height, of which the Douglas spruce is an excellent example, being 250 to 300 ft. high. In Washington the mountains are called the Olympic group and are very rugged, the highest peak, Olympic, being 8,150 ft. high. The mountain range diminishes in size in Oregon, averaging between 4,000 and 5,000 ft. in most parts. In California the C.R. present an insignificant appearance for about 400 m. Further on, nearer San Francisco, they attain to a great height in some peaks, whilst not far from Los Angeles the San Bernardino Peak rises 11,100 ft. high.

COATBRIDGE (55° 52° N., 4° 3′ W.), town, Lanarkshire, Scotland; large ironworks. Pop. 43,000.

COATES, FLORENCE EARLE, was educated at private schools in New England, the Convent of the Sacred Heart in France, and also studied at Brussels. Married Edward Horner Coates in 1879. Was one of the founders of the Contemporary Club in Philadelphia, 1886. President of the Browning Society, Philadelphia, 1896-1903 and 1907-8. Contributed to various magazines both in the U.S. and England, and was the author of *Poems* (poems) in 1898; *Mine and Thine,* 1904; *Lyrics of Life,* 1909; *Ode on the Coronation of King George V.*, 1911; *The Unconqueror of the Air,* and *Other Poems,* in 1912; *Poems,* 2 vols., 1916, and *Pro Patria,* in 1917.

COATESVILLE, a city of Pennsylvania, in Chester co. It is on the Pennsylvania and the Philadelphia and Reading railroads. It has many important industries including the manufacture of iron and steel, brass works, silk, tobacco, automobiles, etc. There are several handsome public buildings including a Y.M.C.A. and a hospital. Pop. 1920, 14,515.

COATI, COATI MUNDI (*Nasua*), genus of mammals allied to the raccoon, living in Mexico, Central and S. America, and characterized by their long flexible snout; they live on trees and feed on insects and lizards.

COBALT ($Co = 59$), lustrous, greyish-white, ductile, metallic element, M.P. 1530°, occurring chiefly in smaltite or speiss-cobalt ($(Co,Ni,Fe)As_2$), cobaltic ($CoAsS$), innæite (Co_3S_4), and skutterudite ($CoAs_3$); obtained by converting the ores into oxides by roasting and reducing the latter by heating with carbon or aluminum. C. forms two series of compounds, cobaltous and cobaltic, and complex salts with ammonia known as cobaltammines, characterized by their red or blue color. They are used as stains or pigments in pottery and glass-making.

COBALT, a city of Canada, in the province of Ontario. It is in the Timiskaming mining district and is on the Timiskaming and Northern Ontario railroad. With the discovery of important deposits of silver, copper, lead and other minerals in 1903, the city grew rapidly. In 1912 a large part of it was destroyed by fire but was quickly rebuilt. Pop. about 7,000.

COBALTITE ($CoAsS$), mineral occurring in compact masses or in lustrous, metallic, silver white, or greyish-reddish cubic crystals. Found chiefly in Scandinavia, Cornwall, and Westphalia, and used for the preparation of smalt.

COBAN (15° 40′ N., 90° 15′ W.), town, on Cojabôn, Guatemala; coffee. Pop. 6,000.

COBB, HENRY EVERSTON (1863), *b.* in Hopewell, N. Y. Was a student at Flushing, N. Y., Institute, 1872-80; New York University from 1880 to 1882 and graduated from Rutgers in 1884 (D.D., 1901 and New York University same year). Ordained a minister of the Dutch Reformed church in 1888. Became pastor of the West End Collegiate church in New York

City in 1903. Was president of the Riverside Day Nursery in New York City; trustee of Vassar and Rutgers colleges also Park Hospital and president of the trustees of the Utica, Miss., Normal and Industrial Institute and director of the Union Theological Seminary. Contributed to Brit. Weekly, Christian Intelligencer and others, and was author of: *The Victories of Youth*, 1900; and *The Ships of Tarshish*, in 1909.

COBB, HENRY IVES (1859), *b.* at Brookline, Mass. Was educatd at private and public schools and at the Massachusetts Institute of Tech.; S.B. Harvard, 1880. He entered an architect's office in Boston and in 1881 went to Chicago where he established a practice. Was architect for the Chicago Opera House, Newberry Library, the University of Chicago, the Church of the Atonement and many other prominent buildings in Chicago and other cities. Was one of the National Board of Architects of the Chicago Exposition in 1893 and from then until 1903 was a special architect for the U.S. Government and designed many of the government buildings at Chicago, League Island and Annapolis. Was also the architect of the American University at Washington.

COBB, HOWELL (1815-1868), an American politician, *b.* in Jefferson County, Ga. Graduating from Franklin College, in 1834, he practiced law, was elected to Congress in 1855 and was Secretary of the Treasury in President Buchanon's Cabinet. Shortly before the outbreak of the Civil War he resigned, joined the Confederacy and was President of the congress which drafted the constitution of the Confederate States. Antagonism between him and Jefferson Davis compelled his retirement, after which he was for a while commander of a Confederate army corps, without, however, seeing any active service. He wrote *A Scriptural Examination of the Institution of Slavery*, 1859.

COBB, IRVIN S(HREWSBURY) (1876), an American author, *b.* in Paducah, Ky. He received his education in the public schools of his native city and then went into journalism, at first as a shorthand reporter. At the age of nineteen he was editor of The Paducah Daily News. His humorous items and articles won him quick recognition, and in 1904 he was in New York writing for several of the foremost daily papers. In 1911 he became connected with the Saturday Evening Post, through which he has gained his widest audience. This publication he represented in Europe during the greater part of the World War. Among the many books he has had published are *Back Home*, 1912; *Europe Revised*, 1914; *The Abandoned Farmers*, 1920; *One Third Off*, 1921, and *Sundry Accounts*, 1922. He has also written a number of plays, most of them in collaboration with prominent playwrights.

COBBETT, WILLIAM (1766-1835) Eng. politician; served in army, 1784-91; in 1792 went to Philadelphia, where he attacked Amer. institutions, for which he was fined; returned to England,, 1800; imprisoned, 1809-11, for protesting against flogging of militia; was elected M.P. for Oldham in 1830, and again 1834; broke down in health and *d.* next year; wrote works on history and politics, and contributed extensively to periodicals; a good stylist and vigorous controversialist.

COBBOLD, THOMAS SPENCER (1828-86), Eng. scientist; lecturer on bot. at St. Mary's hospital, London, on zool. and comparative anat. at the Middlesex hospital; Bot. prof. at Royal Veterinary Coll.; an eminent authority on parasites and parasitic diseases.

COBDEN, RICHARD (1804-65), Brit. statesman; *s.* of a Sussex farmer. He was for some time a commercial traveler, and in 1830 went to Manchester as a cotton printer. He had become interested in political and economic questions and in 1835 pub. a pamphlet, *England, Ireland, and America, by a Manchester Manufacturer*. Was elected M.P. for Stockport, and devoted all his energies to the anti-Corn-Law agitation. After the repeal of the Corn Laws in 1846, Sir Robert Peel acknowledged Cobden as the man to whom success was due. He arranged a commercial treaty between Britain and France in 1860.

COBLENZ, KOBLENZ, ancient *Confluentes* (50° 21′ N., 7° 35′ E.), fortified city, capital of Rhine province, Germany, at junction of Rhine and Moselle, opposite fortress Ehrenbreitstein. C. has numerous ancient buildings and several churches, including church of St. Castor (founded 836; rebuilt XII. cent.); C. belonged to Treves from 1018 till taken by France, 1794; assigned to Prussia, 1815; made seat of govt. of Rhine province, 1822. Coblenz was the headquarters of the American Army of Occupation from Nov. 1918 to January 1923, when the troops, gradually diminished in number, were entirely removed and returned to the United States. Pop. 1919, 56,676.

COB-NUT, fruit of W. Indian *Omphalea triandra*; large hazel nut.

COBOURG (43° 58′ N., 78° 15′ W.), city, Ontario, Canada; foundries, woolen mills. Pop. 4,000.

COBRA, poisonous snake of tropical Asia, especially India; attains a length of almost 6 ft., and is remarkable for its hood formed by the skin of the neck being expanded by the anterior ribs, bearing a white spectacle-mark on the back. It is exhibited by Ind. snake-charmers. *N. haje* is the African cobra, or spy-slange.

COBURN, FOSTER DWIGHT (1846), an American public official, *b.* in Jefferson county, Wis. Going to Kansas after the Civil War, in which he had served as a soldier, he engaged in farming and stock raising. He was Secretary of the State department of Agriculture of Kansas in 1882, and again from 1894 to 1914. He has written much on agricultural subjects, among his works being *Swine Husbandry*; *The Book of Alfalfa*; *Swine in America* and about thirty volumes on similar subjects published by the State of Kansas.

COCA, CUCA (*Erythroxylon coca*), shrub of order Erythroxylaceæ, growing in S. America. The leaves are a powerful stimulant, and are chewed, with an alkali, by the natives, who, under its influence, can go for several days without food. *Cocaine* is obtained from the leaves.

COCAINE ($C_{17}H_{21}NO_4$), alkaloid obtained from leaves of coca plant; white crystalline substance, bitter, slightly soluble in water; exceedingly valuable as local anæsthetic; causes dilation of pupil of eye; strongly poisonous.

COCANDA, COCONADA (16° 57′ N., 82° 15′ E.), seaport, Madras, India; rice, cotton, and sugar exported. Pop. 47,866.

COCCEIUS, JOHANNES, KOCH (1603-69), Dutch theologian; prof. at Bremen, Franeker, and Leiden.

COCCULUS INDICUS, name for brown, dried berries of the climbing shrub *Anamirta cocculus*. Its active principle, picrotoxin, is a powerful poison, and is used in an antiparasitic ointment, and internally to check night-sweats in phthisis.

COCCYX (Anat.), the tail end of the vertebral column in man, consisting of four vertebræ—more or less fused.

COCHABAMBA (17° S., 65° W.), central department, Bolivia, S. America; occupies extensive plateaus among offshoots of E. Cordilleras; grain, rubber; area, 23,321 sq. miles. Pop. 420,000.

COCHABAMBA, OROPESA (17° 25′ S., 65° 45′ W.), city, Bolivia, S. America; bp.'s see; cottons, woolens. Pop. 28,000.

COCHEM (50° 10′ N., 7° 8′ E.), town on Moselle, Germany; wines. Pop. 3,819.

COCHERY, LOUIS ADOLPHE (1819-1900), Fr. statesman; supported revolution of 1870.

COCHIN (*c.* 10° N., 76° E.), native state, India, between Malabar and Travancore, a small portion of S.W. angle bordering Arabian Sea; surface generally occupies sloping plains; watered by numerous rivers forming series of shallow lagoons, subject in wet seasons to sudden swells; communication chiefly by boat; teak forests; rice; capital, Ernakulam; area, 1,362 sq. miles. Pop. 918,639.

COCHIN (9° 58′ N., 76° 17′ E.), seaport town, Malabar district, Madras India; formerly capital of Cochin State; taken from Dutch by British, 1796; shipbuilding. Pop. 20,000.

COCHIN-CHINA (8° 35′ to 11° 43′ N., 104° 25′ to 107° 35′ E.), Fr. possession, S.E. Asia; bounded N. by Cambodia and Annam, S.E. by South China Sea, W. by Gulf of Siam; area, *c.* 20,000 sq. miles; surface mainly broad plain; mountainous in N.; watered by Mekong, Dongnai, and other rivers; climate subject to monsoons. Majority of inhabitants are Annamese; religion, Buddhism. Country has gradually come under Fr. control since 1862; education is good, there are many schools, medical and secular; Saigon, the chief town, is lighted by electricity, and in other respects is modern; area, 21,988 sq. miles. Pop. 3,500,000.

COCHINEAL, reddish dye-stuff, prepared from the hemipterous insect *Coccus cacti*, living on the cactus *Opuntia coccinellifera* of Mexico and Peru. Since carmine and other coloring agents can be obtained from c., the insect has been cultivated, in Algiers, Spain, Canary Islands, for commercial purposes; dye used for confectionery and biological laboratory stains.

COCK, EDWARD (1805-92), Eng. surgeon; pres. Royal Coll. of Surgeons, 1869; introduced new and valuable modes of operation.

COCKADE, bunch of ribbon worn in the hat. *Black* c's were worn in George II.'s army; *white* by Jacobites. In 1798 green c's were worn by the Fr. revolutionaries; these were replaced later by the tricolor.

COCKAIGNE, LAND OF, imaginary land where all is idleness and luxury.

COCKATOOS, *Cacatuidoe*, parrot-like birds which differ from the parrots in bearing a crest of feathers, and in their quiet white, grey, and black coloring; found only in the Australian region and the Philippines. The popular name imitates the call of some species.

COCKATRICE, fabulous monster, said to have been hatched by a reptile from a cock's egg; its look was said to cause death. In mediæval art the c. represents sin generally.

COCKBURN, SIR ALEXANDER JAMES EDMUND (1802-80), Lord Chief Justice of England; ed. Trinity Hall, Cambridge; called to bar 1829; in 1834 was made member of Commission of Inquiry into corporations of England and Wales; Q.C., 1841, became famous as a counsel; elected M.P. for Southampton, 1847; Solicitor-General, 1850; Attorney-General, 1851; Chief Justice of Common Pleas, 1856; was a brilliant orator.

COCKBURN, SIR GEORGE, Bart. (1772-1853), Brit. admiral.

COCKBURN, LORD HENRY THOMAS (1779-1854), Scot. judge; Solicitor-Gen. for Scotland, 1830; author of *Life of Jeffrey*, and *Memorials of his Time*, 1856.

COCKCHAFER, large subterranean beetle (*Melolontha vulgaris*), very destructive to trees, as it feeds on the roots near which it has been laid.

COCK-FIGHTING, sport of 'cocking' with game-cocks.

COCKLE (*Cardium*), genus of bivalve molluscs containing numerous species, the common c. (*C. edule*) being gathered for food. The shell is rounded, ribbed, and shaped like a heart when viewed from one end.

COCKLE, SIR JAMES (1819-95), Eng. mathematician and lawyer; Chief Justice, Queensland, 1863, retiring to England, 1879; performed research in higher algebra; pres., London Mathematical Soc. 1888.

COCKNEY, native of London; the 'Cockney school of poetry' was the name levelled at Keats, Leigh Hunt, and others. 'Cockney' accent is the term applied to pronunciation of lower classes; it is illustrated in Albert Chevalier's 'Coster' songs.

COCK-OF-THE-ROCK (*Rupicola*), genus of northern S. American birds (family Cotingidæ), about size of pigeon; orange plumage and high crest.

COCKPIT.—(1) floor of building, surrounded with rising seats, where cock-fighting took place. (2) after-part in one of lower decks of ship, set aside for wounded during a battle.

COCKRAN, WILLIAM BOURKE (1854-1923), an American lawyer and orator, born in County Sligo, Ireland. He was educated to the priesthood in Ireland and France, but family reverses made it necessary for him to leave school. In 1871 he came to the United States and after a short engagement as a teacher in the private schools, became principal of a public school in Tuckahoe, N.Y. In the meantime he was studying law and in 1876 was admitted to the bar. In connection with his law practice, he became associated with several prominent politicians and his gift for oratory attracted attention to him during his political campaigns in New York City. He was early affiliated with Tammany Hall and from 1881 was delegate to nearly every Democratic State or National Convention. He made a notable speech in 1884 at the Democratic National Convention opposing the nomination of Grover Cleveland. This brought him into national prominence. He was elected to Congress in 1887 and was re-elected in 1891. In the campaign of 1892 he again opposed Grover Cleveland. In 1896, on the issue of free silver, he left the Democratic party and spoke in favor of McKinley in opposition to William J. Bryan. He returned to the party in 1900 and supported Mr. Bryan. He was appointed to Congress in 1894 to fill out an unexpired term and was re-elected in 1905 and 1907. In 1909 he declined the nomination but was re-elected in 1921. In addition to his political career Mr. Cockran was one of the most prominent lawyers in the United States, and he served as chief counsel in many famous cases, including the Becker and Rosenthal murder cases, in which he was counsel for the defendants. He was a consistent opponent of the Prohibition Amendment, and in 1920 led a fight in the Democratic National Convention to have a light wine and beer plank put in the platform. At the same convention he favored the nomination of Alfred E. Smith, of New York, for the presidency. Mr. Cockran spoke frequently in the House of Representatives and was always certain of an attentive audience. He was recognized as the most accomplished orator in that body.

COCKROACH (*Blattidoe*), family of orthopterous insects, with flattened body and long antennæ. Many species troublesome in houses; have an offensive smell. *Stylopyga orientalis* is the common black 'beetle' common in northern countries. *Periplaneta americana* is sometimes found on ships. Fossil c's have been discovered in Carboniferous rocks.

COCK'S-COMB (*Celosia*), herbaceous

annual (order Amarantaceæ), cultivated in various species for its large plume-like mass of red or purple flowers.

COCO DE MER, DOUBLE COCO-NUT (*Lodoicea Sechellarum*), variety of palm found chiefly in Seychelles Islands; fruit is extremely large and takes years to ripen.

COCOA, CACAO, pulverized seeds of the evergreen tree *Theobroma cacao*, order Sterculiaceæ; native of tropical America, cultivated in W. Indies, W. Africa, Ceylon, and E. Indies. The fruit a 'pod' of the shape of a gherkin up to 10 in. in length, contains five cells, in each of which is a row of up to twelve seeds packed in a pulp. The seeds or 'beans' are extracted and fermented in covered barrels or under leaves, thus losing their bitter flavor. When dried and polished they are ready for the market. After roasting they are gently crushed, the product being known as 'nibs.' The latter contain up to 50 of fat, which is extracted in powerful hydraulic presses and used for pharmaceutical purposes. Although a rich beverage can be obtained by boiling nibs in water, the ordinary cocoa, consisting of the finely powdered and prepared seeds partly dissolved but the greater part suspended in boiling water is more palatable. This, when combined with spices, in known as chocolate. See CHOCOLATE. The dietetic value of c. is due to fat, starch, and nitrogenous matters contained and to the stimulating effect of the alkaloid theobromine, allied to the theine and caffeine of tea and coffee.

COCOA-NUT PALM (*Cocos nucifera*), palm-tree found growing to as great a height as 100 feet in tropical Asia, Africa, America, and especially the islands of the Pacific. Coco-nut is a pleasant food; 'milk' contained in c.-nut is a refreshing drink; 'arrack,' a spirituous liquor, is produced from flowers; the timber is used in buildings; coir, copra, and a valuable oil are obtained from various parts of the nut.

COCOON, silky covering spun by various types of larvæ; silkworms' c. of special commercial value.

COCOS (OR KEELING) ISLANDS, group of twenty-three atolls, Ind. Ocean (12° 9′ S., 96° 40′ E.); under Brit. protection since 1856, but owned by Clunies-Ross family; visited by Darwin, 1836; copra, coco-nuts; in Nov. 1914, the Ger. raiding cruiser *Emden* was driven ashore and destroyed on the Cocos by H. M. Australian cruiser *Sydney*. Pop. 600.

COCYTUS (c. 39° N., 21° E.), river, Epirus, Greece; tributary of Acheron.

COD (*Gadus callarias*), soft-finned fish, typical of the family *Gadidoe*, found chiefly in the N. Atlantic waters, much valued as a food and for the oil obtained from it; usually fished for by hand-lines or trawl. C. weigh generally about 10 lb., but have been found weighing as much as 70 lb. The female is very prolific, sometimes producing eight or nine million eggs in spawning season. Cod fishing has long been one of the chief industries of Massachusetts, especially in Boston and Gloucester, where fishing vessels bring their cargoes from the Newfoundland Banks, and other parts of the Atlantic ocean.

CODDINGTON, WILLIAM (1601-1678), one of the founders of the Rhode Island Colony and its first governor. He came to Plymouth Colony from England, in 1630, but eight years later went with 18 others to Aquidneck where he became governor two years later, which position he held till 1647, when the colony was incorporated with Providence Plantations to form Rhode Island. He became governor again in 1674, remaining in that position till his death.

CODE, a compilation, or digest, of laws, often associated with the name of a particular person, such as the 'Justinian C.,' the 'Draconian C.,' the 'Clarendon C.,' the 'Code Napoléon,' etc.; system of rules governing conduct or etiquette ('codo of honor'); table of signs, flags, etc., used in signalling ('Morse C.' and others.).

CODE CIVIL, CODE NAPOLÉON, is the standing body of law in France; drawn up by Pothier and others, and issued under direction of Napoleon, 1804 (who altered several clauses), in it unified and simplified local laws and legal procedure.

CODEINE See OPIUM.

COD-LIVER OIL, oil obtained from the liver of the cod (*Gadus morrpua*) commercially by a process of steaming; contains some acids not found elsewhere in animals. Taken either pure or in emulsions, it is very easily absorbed, and invaluable in building up the frame after wasting diseases like tuberculosis.

CODEX, the name given to ancient written books, especially to important ancient manuscripts, as of the Scriptures or some classical writer. The name was also applied to collections of laws as of the Roman emperors and others, as the Codex Theodosianus, and the Codex Justianus. Below are mentioned the most notable codexes of the Scriptures: the codes Sinaiticus, manuscript of the

Greek Septuagint version of the Old Testament, including also the Old and New Testament and several other portions of the Scriptures. It was discovered in 1859 in the monastery of St. Catherine, on Mount Sinai. It is attributed to the fourth century. In this codex the New Testament is complete while the Old Testament is lacking in certain portions. Second, the Codex Vaticanus, an ancient Greek manuscript of both the Old and New Testaments. This is in the Vatican Library of Rome, from whence it takes its name. This codex is written on thin vellum. Its date is assigned to the fourth century and until the discovery of the Sinaiticu-Codex, was regarded as the best manu. script of the Scriptures. It is lacking the greater part of Genesis of the Old Testament and several of the Epistles and Revelation in the New Testament. Other codexes are the manuscript of Beza, so called after Theodore Beza, the famous reformer, who presented it to the University of Cambridge in 1581. It is supposed to date from the 6th century. Still another is the Ephraem manuscript, so called because some of the compositions of Ephraem the Syrian had been written over it. It is supposed to date from the 5th century.

CODICIL See Will.

CODRINGTON, CHRISTOPHER (1668-1710), Eng. colonial gov. and. soldier; founder of C. Coll., Barbadoes.

CODRINGTON, SIR EDWARD (1770-1851), Brit. admiral; entered navy, 1783; served in war with France, at *Trafalgar*, off Spain, in America, and in Greek War of Independence; cr. K.C.B., 1815; admiral, 1837.

CODY, WALTER HARRISON (1877), son of Edwin Harrison and Elenora Fuller Cody. Educated at public high schools. Studied art and attached to staff of Brooklyn Eagle, 1900-1904. Has contributed pictures to all the leading magazines including Life, Puck and Judge, Saturday Evening Post, Ladies' Home Journal and Harper's Bazaar. Illustrated books by Frances Hodgson Burnett, Robert Chambers, Burgess and many others. Wrote and illustrated *Calib Cottontail.*

CODY, WILLIAM FREDERICK (1846-1917), best known as 'Buffalo Bill,' American hunter, scout and plainsman; born Scott Co., Iowa. His parents removed to the vicinity of Fort Leavenworth, Kan., and from an early age young Cody served as an express rider, carrying packages across the plains which at that time were swarming with hostile Indians. He had many hairbreadth escapes, but his indomitable courage, craft and quickness of eye and arm carried him through in safety. By the time he was of age he was recognized as one of the most fearless and resourceful characters of the West. In 1868-69 he was made chief of scouts in Sheridan's campaign against marauding tribes, and so distinguished himself that his fame became nation-wide. His sobriquet was gained by his skill in hunting buffalo, of which he brought down 4,862 in a single season—in one day killing 69. In the early '80's he gathered together his Wild West Show, embracing Indians, cowboys and relics of the old frontier days, and with this he toured the United States and Europe for more than twenty years, amassing a large fortune. In 1901 he organized what he termed a post-graduate course in manhood, 'The Cody Military College and International Academy of Rough Riders,' where young men were taught horsemanship and deeds of strength. A great tribute was paid to his memory at his burial, when his body was placed in a tomb on the top of Lookout Mountain, twenty miles from Denver. In collaboration with others he published *Story of the Wild West* and *Camp-Fire Chats*, 1888, *The Adventures of Buffalo Bill*, 1904, and *True Tales of the Plains*, 1908.

CODY, COLONEL S. F. (1862), Amer. aviator; first man to fly in Britain; first in War Office Aeroplane Competition, Aug. 1912.

CO-EDUCATION is the instruction in schools and colleges of pupils of both sexes together, boys and girls, and young men and women being taught on the same footing and in the same classes. A co-educational institution is therefore one in which there is no set discrimination or division as male and female students mingle in its classes on equal terms. Co-education in its present development is an outgrowth of the liberalizing tendencies that have directed modern educators along the path laid by the gemininst movement and its demands for affording the same educational facilities for women as for men. The system had been established in the United States long before the progress of women in all walks of professional and business life had reached its present stage, but there is little doubt that its early adoption, providing as it did the same educational advantages for a girl as for a boy, operated to lay the ground for what has been called woman's emancipation.

The colonies started co-education by establishing free education under the disadvantages of the restricted institutional facilities of a newly settled country. That condition brought pupils of both sexes together for joint instruction in one room as a matter of convenience and economy. Therein lay the origin of co-education in the United States, where its development has made it a decidedly American institution in that it has grown with the country and acquired a national character as it grew. Up to the Civil War period co-education in sparsely settled districts might be said to have become sanctioned by the accidental circumstance that free elementary and secondary schools lacked pupils and girls were admitted from the first to both to fill the gaps. Education figured as an important element in the reconstruction policy, under which instruction of the young became reorganized and co-education of the sexes strengthened and enlarged in New England and the Middle States, besides being extended to the west and south.

Today, except here and there in the eastern section, especially in the larger cities, no distinction between boys and girls is made in imparting elementary or secondary education. Co-education has spread from the public schools to State universities of the west and to some privately endowed eastern universities. Among colleges it first obtained a foothold in Ohio (the earliest settled of the Western States) in 1833, when Oberlin Collegiate Institute—later Oberlin College—was opened and admitted both men and women from the start. Thereafter, as other States became settled, they established universities and it became the custom to admit women into them as they opened. In fact, all the State universities of the West have admitted women from the first. A number, but not all, of Southern universities admit women. The growth of co-education in colleges throughout the country has made the United States the only nation in the world where a university education is within the reach, not of a privileged few, but of many thousands of women from all walks of life.

The objections to co-education have been disposed of by experience. If its operation be judged from the date when it became more or less systematized (about 1870), its supporters can point to a test of its working that extends over fifty years. Fears that co-education would lower the standard of scholarship on account of the supposed inferiority of feminine mentality were dispelled by the discovery that women reach as high an academic distinction as men, and frequently higher. No difficulties arose through men and women of marriageable age. It was found that students, on attaining maturity, acquired a greater sense of responsibility, and pursued their studies with a definite career in mind, preparation for which sufficiently occupied them to the exclusion of sex attractions during their studies.

Opposition to co-education has been confined to the secondary or higher school period, beginning from the age of twelve. Under twelve there are no material physical differences between the two sexes. The system, therefore, proceeded with the recognition that the education of boys and girls side by side called for our safeguarding of those physical, intellectual and social differences that are due to sex. In its other aspect it made economy of expenditure of school or college plant and equipment, provided for the natural association of boys and girls as in the family, created an intellectual stimulus which reacted from one to the other, discouraged the exhibition of too much femininity in girls and excessive masculinity in boys, and it especially induced a refinement of atmosphere and manners.

COEFFETAU, NICHOLAS (1574-1623), Fr. Catholic divine; wrote *History of Rome.*

COEHOORN, MENNO, BARON VAN (1641-1704), Dutch soldier and military engineer; took part in war against France, 1673 onwards; distinguished himself under Marlborough, especially at *Namur*, 1692, and at capture of Bonn and siege of Huy, 1703; wrote works on fortification (*q.v.*).

CŒLENTERA, group of animals including zoophytes, jelly-fish, sea-anemones, corals, etc., being marine, with the exception of a few freshwater species (*e.g. Hydra*). They are characterized by the absence of a body cavity (cœlom) apart from the digestive cavity (enteron) and their body wall consists of two layers of cells (ectoderm and endoderm) with a supporting jelly-like middle layer (mesoglœa). They possess stinging cells.

COELLO, ALONSO SANCHEZ (1515-90), Span. artist.

CŒNACULUM, room for supper, (*e.g.*) where Last Supper was eaten.

CŒNWULF (*d.* 821), king of Mercia, a division of England (796).

CŒUR, JACQUES (*c.* 1395-1456), Fr. merchant; founder of trade between France and the East; in 1436 went to court of Charles VII. and assisted in purifying the coinage; *d.* on expedition against Turks.

CŒUR D'ALENE, a city of Idaho, in Kootenai co., of which it is the county seat. It is on the Northern Pacific, the Chicago, Milwaukee and St. Paul, and other railroads. The city has important manufactures of lumber, machinery, bricks, etc. It is also the center of an important fruit growing and agricultural region. It is the seat of Cœur d'Alene College and a Catholic Academy. There are parks and several handsome public buildings. Pop. 1920, 6,473.

COFFEE, the seeds of evergreen shrubby trees of the genus *Coffea* (order Rubiaceæ), particularly of the species *C. arabica* and *C. liberica.* The beverage has been known in Abyssinia for probably more than a thousand years, and the plant was introduced into Arabia in the 15th cent. and later became more extensively cultivated in tropical Asia and America. Its white and fragrant flowers grow in clusters in the axils of the leaves. The fruit is a red, fleshy berry resembling a cherry, and containing seeds in a yellowish pulp. The seeds are enclosed in a membrane (endocarp) called the 'parchment,' and each seed in a finer covering known as 'silver skin.' The pulp is removed either after drying the 'cherries' in the sun or in the wet method by water and special machinery; the seeds are subsequently dried, the parchment and silver skin removed by rollers, rubbing, and winnowing, and the beans are ready for shipping. They are sorted out into various grades to ensure uniformity in roasting. Roasting and grinding should be carried out shortly before the decoction is made. The valuable physiological action of coffee as a stimulant of the nervous and vascular system is to a great extent due to the alkaloid caffeine. Coffee is frequently adulterated, chiefly with chicory. The latter is widely used on account of its rich brown infusion with hot water which gives 'body' to weak coffee. Arabian coffee is called *mocha.* The principal coffee-producing country is Brazil; it is also largely produced in Colombia, Java, Venezuela, Guatemala, Brit. India, Haiti. The pre-war consumption of coffee per head per annum was approximately: Holland, 15 lb.; U.S., 12 lb.; Germany, 7 lb.; France, 5 lb.; Austria-Hungary, 2 lb.; U.K., 1 lb.

COFFEE-HOUSES, predecessors of the modern club; first opened in Constantinople during XVI. cent.; introduced into England, 1650, France, 1671, and soon into other European countries; they formed a resort for men of fashion, and different houses were patronized by different cliques; Addison patronized Button's, gamblers resorted to Jonathan's in Change Alley, Scotsmen flocked to the British in Cockburn Street. C.h. were means of circulating news before the introduction of daily papers.

COFFER, chest for valuables; mediæval Ital. marriage-coffers were often carved, inlaid, and otherwise richly decorated; also term for a certain panel in architecture.

COFFERDAM, a water-tight enclosure of clay and piles, from which the water is pumped, in a river, etc., in order to construct foundations for bridges, piers, etc.; also a water-tight appliance on the side of a ship to facilitate repairs under water.

COFFEYVILLE, a city of Kansas, in Montgomery co. It is on the Missouri, Pacific, the Atchison, Topeka and Sante Fe railroads, and on the Verdigris river. It is an important manufacturing city and its industries include flour and planing mills, railroad shops, oil refineries, glass factory, etc. Pop. 1920, 13,452.

COFFIN, receptacle for the dead. The ancients used c's made of baked clay; stone came later into use, and lead c's were common during Middle Ages. Wooden shells came into general use during the XVII. cent., before which time the poor were buried merely in grave-clothes.

COFFIN, CHARLES CARLETON (1823-1896), an American writer, *b.* in Boscawen, N.H. During the Civil War he was correspondent at the front for the Boston Journal, serving in the same capacity in Europe during the Austro-Prussian War, in 1866. Later he began to write books, mostly for boys, which enjoyed a wide popularity for many years. Among them are *The Boys of '76*, 1879; *Building the Nation*, 1883; *The Drum-Beat of the Nation*, 1887, and *Freedom Triumphant*, 1891.

COFFIN, HENRY SLOANE (1877), *b.* in New York City. Graduated from Yale in 1897, M.A., 1900. Studied at the New College at Edinburgh, Scotland from 1898-9 and at the University of Marburg in 1899. B.D., Union Theological Seminary, 1900; (D.D., New York University, 1906 and Yale University in 1915). Was ordained a Presbyterian minister in 1900 and was pastor of the Bedford Park Church, N.Y. City from 1900 to 1905 when he became pastor of the Madison Ave. Church, New York City. Also was associate professor of practical theology at Union Seminary in 1904 and preached annually at Yale, Princeton and other Colleges. Author: *The Creed of Jesus*, 1907; *Social Aspects of the Cross*, 1911; *The Christian and the Church*, 1912; *University Sermons*, 1914; *The Ten Commandments* and

Christian Convictions in 1915; *In a Day of Social Rebuilding*, (Lyman Beecher's Lectures at Yale), 1918, and *A More Christian Industrial Order*, 1920. Was also co-author of *Some Social Aspects of the Gospel* in 1912 and edited *Hymns of the Kingdom*, 1910.

COFFIN, WILLIAM ANDERSON (1855), an American painter, *b.* at Allegheny, Pa. After preliminary instruction in this country, he studied painting in Paris under Leon Bonnat, during 1877-82, after which he opened a studio in New York City, specializing in landscapes and figure pieces. During 1886-91 he was art critic for the New York Evening Post and The Nation, and for The Sun during 1896-1900. His work is represented in the New York Metropolitan Museum of Art, the National Collection in Washington, D.C. and noted galleries in Europe.

COG, round-bodied, trading ship of mediæval times.

COGHLAN, CHARLES FRANCIS (1841-1899), an Irish-American actor, *b.* in Paris, of Irish parents, brother of Rose Coghlan. After rising to some prominence in London as a comedian he came to this country, in 1876, and played under the direction of Augustin Daly, attracting especial attention in the leading part in *The Celebrated Case.* He created the part of Alec d'Urberville opposite Mrs. Fiske in *Tess of the D' Ubervilles*, in 1897. He also wrote a number of the plays in which he starred, among them being *Lady Baxter*; *A Quiet Rubber*, and *Citizen Pierre.*

COGHLAN, ROSE (1853), an Irish-American actress, *b.* in Peterborough, England. She came to this country in 1871, with E. H. Sothern, played for a while in burlesque at Wallack's Theatre, in New York, returned to England two years later, where she played with Jefferson in *Rip van Winkle.* In 1877 she returned to Wallack's, where she became popular as Countess Zicka in *Diplomacy.* Her widest popularity is based on her many appearances as Lady Teazle in *The School for Scandal*, which established her reputation for comedy parts. During 1909-10 she was with the famous New Theatre Co. in New York. In 1923, after a period of retirement lasting some years, she appeared in a revival of *The School for Scandal.*

COGNAC (45° 41′ N., 0° 19′ W.), town, Charente, France; brandy.

COGNITION, term used to denote state of conscious knowledge of anything, whether physical or not.

COHAN, GEORGE (MICHAEL) (1878), an American actor, theatrical producer and playwright, *b.* in Providence, R.I. He first appeared at the age of nine in *Daniel Boone*, in Haverstraw, N.Y. Later he went into vaudeville, with his act *The Four Cohans.* He has written, produced and appeared in a great number of plays, among the best known being *The Yankee Prince*, 1909; *Get-Rich-Quick-Wallingford*, 1910; *Seven Keys to Baldpate*, 1913, and *Hit-the-Trail Holliday*, 1915. In 1923 he produced *Little Nellie Kelly.* During the actors' strike of 1919 he organized The Fidelity League, in direct opposition to the actors' organization, The Actors' Equity Association.

COHEN, OCTAVUS ROY (1891), *b.* in Charleston, S.C. Graduated from Porter Military Academy at Charleston in 1908 and Clemson College, S.C., in 1911. From 1909-10 was employed as a civil engineer by the Tennessee Coal, Iron and R.R. Co. and was with the editorial departments of the Birmingham (Ala.) Ledger; Charleston (S.C.) News and Courier; Bayonne (N.J.) Times and the Newark (N.J.) Morning Star from 1910 to 1912. In 1913 was admitted to the South Carolina Bar and practiced for two years but from 1915 devoted his time entirely to writing. Among his works are: *The Other Woman* (with J.U. Giesy), 1917; *The Crimson Alibi*, and *Polished Ebony* in 1919; *Gray Dusk* and *Come Seven*, 1920; *Six Seconds of Darkness* and *Highly Colored*, 1921, and *Midnight* in 1922. Also contributed a series of negro stories to the Saturday Evening Post and wrote several plays, among which are *The Crimson Alibi* (with George Broadhurst), 1919; and *The Scourge, Come Seven* and *Shadows* in 1920.

COHESION, the molecular force that holds together the particles of solids or liquids; in solids it is measured by the tensile stress under which they break; cohesion of liquids is much smaller than that of solids, but in addition there is the phenomenon of surface tension, illustrated in the formation of drops.

COHN, FERDINAND JULIUS (1828-98), Ger. botanist; prof. of bot., Breslau, 1859; founder of the science of bacteriology; did invaluable research on bacteria algæ, and fungi, and pub. many notes on these and allied subjects.

COHOES, a city of New York. in Albany co. It is on the New York Central and the Delaware and Hudson rivers, and at the junction of the Erie and Champlain canals, 9 miles north of Albany. At this point the Mohawk River has a fall of over 70 feet and supplies an unlimited amount of power. This is utilized to make the city an important manufacturing center. Its industries include cotton, woolen and worsted knit goods, foundry and machine shop products, boots and shoes, tobacco, paper boxes, etc. There is electric street railway connection with Albany, Troy and other nearby cities. Its public buildings include a public library, St. Bernard's Academy, and several churches. Pop. 1920, 22,987.

COHORT, in Rom. army military body about 600 strong, or tenth part of legion; loosely, a body of armed men.

COIF, part of insignia of sergeants-at-law; white piece of cloth with smaller black portion superimposed, placed on top of wig; formerly used to be skull-cap.

COIMBATORE (10° 59′ N., 76° 59′ E.), district, Madras, India; flat country hemmed in by mountains on N., W., and S.; watered by Cauvery and tributaries; area, 7,860 sq. miles. Pop. 2,201,752. Capital, Coimbatore, on Noyil; ceded to Britain, 1799; exports cotton, cereals, cattle, and hides. Pop. 53,080.

COIMBRA (40° 13′ N., 8° 24′ W.), town, on Mondego, Beira, Portugal; formerly capital of Portugal and burial-place of many early kings; bp.'s see; has two cathedrals; famous univ. (founded 1288); library and military coll.; grain, fruit. Pop. 18,144.

COIN (36° 44′ N., 4° 50′ W.), town, on Séco, Málaga, Spain; marble quarries.

COINAGE, AMERICAN. The present (1923) metallic money of the United States consists of gold coins in denominations of $2.50, $5, $10 and $20; silver dollars, half-dollars, quarters and dimes; nickel five-cent pieces and copper cents. The gold coins have a weight of 25.8 grains to the dollar, silver dollars 412.5 grains, the smaller silver coins 385.8 grains to the dollar, the nickels 77.16 grains, and the cent piece 48 grains. The gold and silver dollar coins are unlimited as to issue and as legal tender, and are receivable for all public dues. The minor silver coins are legal tender up to $10 and the nickels and cents up to 25 cents.

The federal constitution endows Congress with the exclusive right to coin money and regulate its value. This right is the prerogative of an established government and a foremost mark of sovereignty. Coinage needs the authority of the State, but a government must exercise its good faith in issuing it and safeguard its face value by the amount of gold, silver or copper used in the minting of each piece. Government mints have arisen to secure uniformity of the coin in its manufacture and to maintain its integrity in circulation. States and individuals are forbidden to coin money. Coins that have not been made at at government mint are spurious and their manufactures and utterance a crime against the United States. The processes of manufacturing a good counterfeit, however, are so complex that secret manufacture rarely escapes detection in time.

As the wear and tear of coins in circulation from hand to hand slowly obliterates the design and reduces weight, coinage legislation fixes the stage of wear at which a coin loses its legal value. American gold coins are legal tender only by weight when they lose more than one half of one per cent of their weight in 20 years from date of issue. When received back into government channels they are despatched to the mint and recoined. The coinage is kept in good condition generally by periodic withdrawals from circulation of worn pieces. Coins of certain dates will be called in and replaced by new ones, but the government notifies the public that after a certain period such coins not called in will lose their par value as legal tender.

Private bullion is converted into coin at the government mints, sometimes free. Gratuitous coinage of bullion brought to the mint by individuals prevails both in the United States and England as promoting the transformation of bullion into coin to meet trade demands.

The present regulations for the minting of United States coinage dates from 1900, when a currency measure was passed which ended a long struggle between political parties over the standard of value.

COINS, as legal medium of exchange, replaced metal ingots *c.* 720 B.C.; first struck in Asia Minor, bearing head of lion; Gk. coins bore head of god, or scene from mythology, as well as name of city; some are beautifully designed; gold, silver, copper, brass used; in mediæval times the habit of clipping coins led to much annoyance, as coin was seldom its full face value.

COINS, FOREIGN, VALUE OF. The following table gives the value, in United States coinage, of the principal coins in foreign countries. It should be borne in mind that these values are pre-war; that is, prior to 1914. In most of the countries of Europe the currency was so inflated in the years following the war that no standard value attached to the coinage. This was especially true in Germany, Poland, Austria and Russia.

(Proclaimed by the Secretary of the Treasury as of July 1, 1922.)

Argentine Republic, G., Peso ($0.9648). Currency: Paper, normally convertible at 44 per cent. of face value; now inconvertible.

Austria, G., Krone ($0.2026).

Belgium, G. and S., Franc ($0.1930). Member Latin Union; gold is actual standard.

Bolivia, G., Boliviana ($0.3893). 12½ bolivianos equal 1 pound sterling.

Brazil, G., Milreis ($0.5462). Currency: Government paper normally convertible at 16 pence (—$0.3244) per milreis.

British Colonies in Australasia and Africa, G., Pound sterling ($4.8665).

British Honduras, G., Dollar ($1.0000)

Bulgaria, G. Lev ($0.1930).

Canada, G., Dollar ($1.0000).

Chili, G., Peso ($0.3650). Currency: Inconvertible paper.

China, S., Tael, Haikwan (customs) ($0.8463). The tael is a unit of weight not a coin. The customs unit is the Haikwan tael. The values of other taels are based on their relation to the value of the Haikwan tael. The Yuan silver dollar of 100 cents is the monetary unit of the Chinese Republic; it is equivalent to .644+ of the Haikwan tael. Dollar, Yuan ($0.5390). Mexican silver pesos issued under Mexican decree of Nov. 13, 1918, are of silver content approximately 41% less than the dollar here quoted; and those issued under decree of Oct. 27, 1919, contain about 51% less silver.

Colombia, G., Peso ($0.9733). Currency: Government paper and gold.

Costa Rica, G., Colon ($0.4653).

Cuba, G., Peso ($1.0000).

Denmark, G., Krone ($0.2680).

Ecuador, G., Sucre ($0.4867).

Egypt, G., Pound (100 piasters) ($4.9431). The actual standard is the British pound sterling, which is legal tender for 97½ piasters.

Finland, G., Markka ($0.1930).

France, G. and S., Franc ($0.1930). Member Latin Union; gold is actual standard.

Germany, G., Mark ($0.2382).

Great Britain, G., Pound sterling ($4.8665).

Greece, G. and S., Drachma ($0.1930). Member Latin Union; gold is actual standard.

Guatemala, S., Peso ($0.5074). Currency: Inconvertible paper.

Hayti, G., Gourde ($0.2000). Currency: Inconvertible paper.

Honduras, S., Peso ($0.5074). Currency, bank notes.

India (British), G., Mohurand Sovereign ($4.8665); S. Rupee ($0.2411). The British sovereign and half sovereign are legal tender in India at 10 rupees per sovereign.

Indo-China, S., Piaster ($0.5480).

Italy, G., Lira ($0.1930). Member Latin Union; gold is actual standard.

Japan, G., Yen ($0.4985).

Liberia, G., Dollar ($1.0000). Currency: Depreciated silver token coins. Customs duties are collected in gold.

Mexico, G., Peso ($0.4985).

Netherlands, G., Guilder (florin), ($0.4020).

Newfoundland, G., Dollar ($1.0000).

Nicaragua, G., Cordoba ($1.0000).

Norway, G., Krone ($0.2680).

Panama, G., Balboa ($1.0000).

Paraguay, G., Peso (Argentine), ($0.9648). Currency: Depreciated Paraguayan paper currency.

Persia, S., Kran ($0.0934). Currency: Silver circulating above its metallic value. Gold coin is a commodity only, normally worth double the silver.

Peru, G., Libra ($4.8665).

Philippine Islands, G., Peso ($0.5000).

Portugal, G., Escudo ($1.0805). Currency: Inconvertible paper.

Roumania, G., Leu ($0.1930).

Russia, G., Ruble ($0.5146).

Salvador, G., Colon ($0.5000).

Santa Domingo, G., Dollar ($1.0000).

Serbia, G., Dinar ($0.1930).

Siam, G., Tical ($0.3709).

Spain, G. and S., Peseta ($0.1930). Valuation is for gold peseta; currency is notes of the Bank of Spain.

Straits Settlements, G., Dollar ($0.5678).

Sweden, G., Krona ($0.2680).

Switzerland, G. Franc ($0.1930). Member Latin Union; gold is actual standard.

Turkey, G., Piaster ($0.0440). (100 piasters equal to the Turkish £).

Uruguay, G., Peso ($1.0342). Currency: Inconvertible paper.

Venezuela, G., Bolivar ($0.1930).

G, means gold standard country; S, silver.

Value in U.S. money is stated in parentheses.

COIR, fibrous substance obtained from external husk of coco-nut; used for making matting, etc.

COIRE, CHUR (46° 51′ N., 9° 32′ E.), town, Grisons, Switzerland; ancient *Curia Rhoetorum*; many interesting specimens of mediæval arch.; bp.'s see; center of transit trade in wine, tobacco, and clocks. Pop. 15,100.

COKE, a derivative of bituminous coal, or the solid residue thereof after the expulsion of its gaseous elements by heat or dry distillation. The resulting product universally known as coke, is a porous solid, and chiefly consists of carbon intermixed with the ash and other mineral matter, including sulphur and phosphorous of the coal it comes from. It is hard and brittle, with a varying metallic lustre, and blackish gray in color. It is a by-product of coal in the extraction of illuminating gas, but it is also specially produced for blast furnace fuel from coal of a low content of volatile resinic matters. The production of pit iron has been greatly stimulated by the adaptability of coke as fuel for blast furnaces. Coke possesses all the advantages and none of the disadvantages of anthracite coal and charcoal for metallurgical purposes. Its porous character makes it readily combustible and its hardness enables it to sustain furnace charges. Its use is increasing in other directions, notably as a filtering material in water and sewage purification, as railroad locomotive fuel, and in periods of coal stringency, as in the winter of 1922-23, it was used as furnace fuel in houses and buildings. It is smokeless and does not emit sparks.

The distilling process that evolves coke from coal yields a number of valuable products, including tar, the raw material in the aniline dye and briguette industry, while the drawn-off gas itself is utilized as fuel as well as light, and from it oils are also obtained. Ammonia sulphate is another by-product from which comes the anhydrous ammonia and aqua ammonia used in refrigerating plants. In the recovery of oils from the gases, carbolic acid was the main ingredient of the high explosives used in the World War, such as English lyddite and French melinite, and the by-products of coke ovens are thus invaluable in furnishing fighting equipment in modern wars.

In the production of coke, the coal is first broken up, cleaned and sorted from the slate and fire clay which the cleaning reveals. The methods used for turning coal into coke either are by open-air burning, a primitive and defective process, or by the beehive oven, or by the retort oven. Open-air burning simply consists in firing the coal, which is stacked on the ground in a square heap, by means of longitudinal and vertical flues running through it and filled with sufficient wood to ignite the mass. When all the gas has been expelled (anu asted) by this heating, the fire is banked and partly smothered by fine dust and the mass afterward sprinkled with water, producing steam that permeates the coke heap. The beehive oven, so called because of its domeshaped interior, is built of stone and lined with fire-brick. It is about 12 feet in diameter and rises six or seven feet at its crest. The coal is charged into it through a hole in the roof. The source of heat is at the top and the coking operation therefore proceeds downward. Bee-hive ovens are credited with producing the best metallurgical coke, but in some types, valuable by-products like gas, ammonia and tar, are lost. The retort or by-product oven was devised to save the by-products and utilize low grades of coal. It is a narrow structure, 20 to 40 feet long, 7 to 9 feet high, and 1½ to 2 feet wide, and is so equipped and operated that, in addition to conserving the by-products of coking, it utilizes gases thrown off from the coal for its own heat. Retort ovens yield coke averaging about 75% of the coal burned.

COKE, SIR EDWARD (1552-1634), Eng. barrister; ed. Trinity Coll., Cambridge; called to bar, 1578; his abilities were soon recognized; elected M.P. and Speaker, 1593; Attorney-General, 1594; Crown lawyer in trial of Raleigh, and remembered for brutality to accused; Chief Justice of Common Pleas, 1606; offended king, and was imprisoned, 1620; retired, 1628; famous as a legal writer.

COKE, THOMAS (1747-1814), Anglican clergyman, then follower of Wesley; became Methodist bp. in America, 1787; anti-slavery worker.

COLA. See Kola.

COLBERT, JEAN BAPTISTE (1619-83), Fr. statesman. In 1651 he was employed by Cardinal Mazarin, and quickly rose in influence. After Mazarin's death in 1661 he entered the employment of Louis XIV., and was made superintendent of buildings, 1664, controller-general, 1665, and minister of marine, 1669.

COLBERT DE CROISSY, CHARLES MARQUIS (1625-96), Fr. diplomatist; Intendant of Alsace, 1658; represented France at conference of Aix-la-Chapelle; ambassador to London, 1668.

COLBURN, ZERAH (1832-1870), an American technical writer, *b.* in Saratoga, N.Y. He founded 'The Railroad Advocate' in New York, in 1854. Later he went to London, where he became editor of the London Engineer, in 1858. There he founded a new journal, Engineering, in 1866. Four years later he returned to the United States, where he committed suicide.

COLBY, BAINBRIDGE (1869), an American lawyer, *b.* in St. Louis, Mo. After graduating from Williams College, in 1890, he studied law in Columbia Law School, and began to practice in 1892. He represented Mark Twain in clearing up the affairs of the latter's publishing business. In 1912 he was actively identified with the effort to organize the Progressive Party and was candidate for the U.S. Senate for that party in 1914. During the war against Germany he was Commissioner of the U.S. Shipping Board, and from March, 1920, until March, 1921, he was Secretary of State in President Wilson's Cabinet. From 1921 he was associated with Woodrow Wilson in the practice of international law.

COLBY, FRANK MOORE (1865), an American editor, *b.* in Washington, D.C. After graduating from Columbia University, in 1888, he studied political science, of which subject and history he was instructor and later professor in Amherst College, Columbia University and Barnard College, and finally in the University of New York. Since 1900 he has been editor of the New International Encyclopedia. He has written *Outlines of General History*, 1900; *Constrained Attitudes*, 1910, and *The Margin of Hesitation*, 1921.

COLBY, HARRISON GRAY OTIS (1846), *b.* in New Bedford, Mass. Graduated from the U. S. Naval Academy, 1867. Served on the U. S. S. Dakota during the Civil War. Was promoted through various grades and made a captain in 1902. During the Spanish American War was Commander of the U.S.S. Hannibal and 2nd District Coast Defense and also in charge of selecting proper vessels for the government to purchase. Was Captain of the Olympia; Commander of the European Squadron and in command of the Cruiser Division of the North Atlantic Fleet, 1904-5. In 1905 was in command of a special squadron sent to Havana in March of that year. Was also executive officer of the yacht *America* in race for the Queen's Cup with the *Cambria* and other yachts and was later in command of the *America*; commander of the U.S. Coast and Geog. Survey schooner *Engre* and Steamer *Blake*. Retired a rear-admiral, Jan. 28, 1908. Worked in Paris from 1916-18 for the American Red Cross and The American Fund for French Wounded. Was recalled for active duty with the U.S. Navy in Sept. 1918.

COLBY COLLEGE, in Waterville, Me., a co-educational institution under Baptist influence, was founded in 1818 as The Maine Literary and Theological Institution. In 1820 its name was changed to 'Waterville College.' In 1867 it was named 'Colby University' in honor of Gardiner Colby, who gave $200,000 toward its endowment. Since 1899 it has been Colby College. In 1921-22 it had a student body of 486 and a faculty numbering 28.

COLCHAGUA (34° 35′ S., 71° W.), province, Central Chile, between Argentina and Pacific, S. America; capital, San Fernando; stock-raising, mining; area, 3,849 sq. miles. Pop. 159,421.

COLCHESTER (51° 53′ N., 0° 24′ E.), market town, river port, on Colne, Essex, England; site of first Rom. colony in Britain (*Camulodunum*); before conquest, seat of Brit. king, Cunobelin (Shakespeare's Cymbeline); ancient Rom. walls almost entire; museum of Rom. antiquities; castle—largest specimen of Norman arch. in England; remains of Augustinian Priory; many churches; grammar school (founded 1539) and a military dépôt. Pop .43,463.

COLCHESTER, a town of Vermont, in Chittenden co. It includes several villages. Pop. 1920, 6,627.

COLCHESTER, CHARLES ABBOTT, 1ST BARON (1757-1829), Eng. politician; Speaker of House of Commons.

COLCHIS, ancient name of district of Asia Minor, eastern end of Black Sea, S. of Caucasus; nearly corresponding to former province Mingreli (modern Kutais); in Gk. myth. home of Medea and sorcery; land of 'Golden Fleece'; after Mithridatic war, became subject to Rome; annexed by Russia, 1866.

COLCORD, LINCOLN ROSS, *b.* at sea. Graduated from the high school at Searsport, Me., 1900. In 1900 entered the University of Maine where he studied intermittently until 1906, when after completing half of the junior term he finally left. His family were seafarers extending back for five generations and until he was 14 years of age was at sea with his father making voyages to China and trading on the China Sea. In 1906 he entered the employ of the Bangor and Aroostook railroad as a civil engineer in the Maine woods and remained in this position until 1909 in which year he began writing short stories. Among his works are: *The Drifting Diamond*, 1912; *The Game of Life and Death*, 1914; *Vision of War*, 1915, and *An Instrument of the Gods*, 1922. Was also staff correspondent of the Philadelphia Public Ledger, Washington Bureau, 1917-18, and associate editor of The Nation from 1919-20.

COLCOTHAR, name for reddish-brown ferric oxide obtained as a residue from distillation of ferrous sulphate in the manufacture of fuming sulphuric acid; used as a polishing powder and as a pigment (Ind. red).

COLD, low temperature, a decrease of the rapid molecular vibration which causes heat. The absolute zero or temperature at which there is no heat cannot be obtained practically. It is —273°. The nearest approach to it is liquid helium, which boils at 4°.3 absolute.

COL DI LANA, an Alpine peak, 4,815 feet above sea level, above the road from Falzarego to the Pordoi Pass, in the Dolomites. It was the center of military operations between Austrian and Italian forces, during the World War. During April, 1916, there was a sanguinary struggle for possession of this peak, which had important strategic value. The Italians had repeatedly attempted to take the peak by frontal attack, unsuccessfully and with great loss. Finally the Italian engineers began mining and on the night of April 18 the top of the peak was blown off by the Italian mine explosion, only 164 Austrians out of more than 1,000 occupying the position surviving. Henceforward the position remained in the hands of the Italians.

COLD HARBOR, a city of Virginia, in Hanover co., 9 miles northeast of Richmond. It is notable for being the scene of two battles during the Civil War, the most important on June 3, 1864, between the Confederate army and the Federal army under General Grant. A similar encounter took place on June 27, 1862, at Gaines Mill.

COLD STORAGE. See FOOD.

COLDWATER, a city of Michigan, in Branch co., of which it is the county seat. It is on the Lake Shore and Michigan Southern railroad, and on the Coldwater river, 156 miles east of Chicago. The river supplies power for several important manufacturing establishments. Here is the State School for Dependent Children. There are also libraries, a public high school, and a national bank. Pop. 1920, 6,114.

COLE, SAMUEL VALENTINE (1851), *b.* Machiasport, Me. Graduated from Bowdoin, in 1874, A.M., 1877 (D.D., 1898; and LL.D. 1912). Also graduated from the Andover Theological Seminary in 1887. For several years was tutor in rhetoric and Latin instructor at Bowdoin. Was ordained a minister in 1889 and was pastor of the Trinitarian Congl. church at Taunton, Mass., for nine years. Was president of Wheaton Seminary from 1889-97 and its successor, Wheaton college, 1912. In addition to his contributions to various magazines, reviews and religious publications he was the author of *In Scipio's Gardens and Other Poems*, 1901; *The Life That Counts*, 1905; *Fidelissima*, 1908; and *The Gray King and Other Poems*, in 1914.

COLE, THOMAS (1801-48), Amer. landscape artist.

COLE, TIMOTHY (1852), an American wood engraver, *b.* in London, England. He came to this country with his parents at the age of five. In 1883 he went to Europe to engrave the old masters, finishing the first of his Italian series in 1892. Then followed successively his Dutch and Flemish, English, 1900; Spanish, 1907; and French, 1910, series. In 1922 he was engaged on the old masters in American public and private galleries. He is the author of a *Monograph on the Lives of Dutch Masters*, with notes on their works, first published in Century Magazines during 1892-6, and *Notes to English Masters*, appearing in the same publication during 1897-1901.

COLDEN, CADWALLADER (1688-1776), Scottish-Amer. physician, botanist and politician; was acting governor of New York at outbreak of War of Independence, and supported Brit. government; student of botany; introduced Linnæan system into America.

COLDEN, CADWALLADER DAVID (1769-1834), Amer. lawyer and politician.

COLDSTREAM (55° 40′ N., 2° 19′ W.), town on Tweed, Berwickshire, Scotland; 'Coldstream Guards' raised here, by 1650, by Gen. Monck.

COLENSO (28° 44′ S., 29° 50′ E.), village, Natal, S. Africa; scene of Brit. repulse in Boer War, Dec., 1899.

COLENSO, JOHN WILLIAM (1814-83), Anglican ecclesiastic; bp. of Natal, 1853; translated New Testament into Zulu; pioneer in 'Higher Criticism'; pub. works on Pentateuch.

COLEOPTERA, order of insects (Hexapoda) including the beetles and weevils, altogether about 150,000 species, characterized by the modification of the anterior pair of wings into hard horny covers (elytra) for the membranous posterior pair, which are folded underneath when not in use. In species with terrestrial habits the hind wings are greatly reduced in size, and the elytra frequently become fused to form an armor for the abdomen. The jaws are adapted for biting, the mandibles often being powerfully developed, those of the stag-beetle being a well-known example. As a rule the integument of the beetle is hard and horny, and the prothorax is movable on the mesothorax. The c. undergo complete metamorphosis, are holometabolic. The larvæ are more or less active grubs, and the inactivity pupæ have their appendages free, not fixed to the body as in the case of butterfly pupæ. The development sometimes occupies many years. Some families are aquatic, as the Dytiscidæ and Hydrophilidae, Stag-beetles, chafers, weevils, ladybirds glow-worms, and click beetles are a few of the more representative families.

COLEPEPER, JOHN COLEPEPER, 1ST BARON CULPEPPER (*d.* 1660), Eng. politician; at first against the king but changed for fear of revolution; fought in Civil War; accompanied Charles II. in exile.

COLERAINE (55° 8′ N., 6° 41′ W.), seaport, market town, on Bann, Londonderry, Ireland; linen; salmon fisheries. Pop. 6,500.

COLERIDGE, JOHN DUKE COLERIDGE, 1ST BARON (1820-94), Lord Chief Justice of England; ed. at Eton and Balliol Coll., Oxford; called to bar, 1846; Liberal M.P. for Exeter, 1865; showed ability at the bar and in the House; took part in the first Tichborne trial; became Chief Justice of Common Pleas and baron in 1873; Lord Chief Justice, 1880.

COLERIDGE, SAMUEL TAYLOR (1772-1834), Eng. poet, *b.* Ottery St. Mary, Devon, where his *f.* was vicar; ed. Christ's Hospital, and Jesus Coll., Cambridge; got into debt and enlisted in the dragoons, but was bought off by his family. C. and Southey married two sisters, Sara and Edith Fricker, and proposed to found a 'pantisocratic' settlement in America, but the scheme was abandoned. At Nether Stowey, Somerset, C. had Wordsworth for neighbor, and there they planned their joint-work, the *Lyrical Ballads*, 1798, to which C. contributed *The Ancient Mariner*; here also he wrote the first part of *Christabel*, and *Kubla Khan*, pub. 1816. An earlier vol., *Poems on Various Subjects*, had appeared in 1796. C. had become a Unitarian, and, after the Somerset period, acted for some time as preacher. He spent a year in Germany, where he became interested in metaphysics. In 1779 he was in London, writing for the Morning Post; made his home at Keswick, 1800, and pub. his trans. of Schiller's *Wallenstein*. His drama, *Remorse*, was produced at Drury Lane in 1913. His later publications include *Biographia Literaria*, *Sibylline Leaves*, *Aids to Reflection*, *The Constitution of Church and State*; and other works were published posthumously.

COLERIDGE, SARA (1803-52), Eng. poetess and miscellaneous writer; dau. of Samuel Taylor C.; pub. several translations from foreign authors; also *Pretty Lessons in Verse*, and a fairy tale, *Phantasmion*.

COLERIDGE-TAYLOR, SAMUEL (1875-1912), Brit. musician; *s.* of Eng. mother and W. African father; set *Hiawatha* to music; wrote *The Atonement*, a cantata; early death cut short promising career.

COLESBURG (30° 34′ S., 25° 33′ E.), town, C. province, Cape Province, S. Africa.

COLET, JOHN (1467-1519), Eng. Renaissance scholar; lectured on St. Paul at Oxford; one of pioneers of Humanistic movement; refounded St. Paul's School, 1512.

COLET, LOUISE (1810-76), Fr. novelist and poet.

COLEUS, genus of tropical herbs or shrubs with labiate flowers and ornamental foliage, for which various species have been cultivated in gardens.

COLFAX, SCHUYLER (1823-85), Amer. politician; member of Congress, Republican, 1855-69; Vice-President of U.S.A., 1869-73; suspected of corruption, he retired into private life, 1872.

COLGATE UNIVERSITY, a nonsectarian institution at Hamilton, N. Y., founded in 1819. In 1921-22 the faculty numbered 50 and the student body numbered 678. The assets of the institution amounted to $3,140,880, and the library contained 95,441 volumes.

COLIC, a vague medical term, applied to sudden spasmodic pain in the abdomen; if the patient seems collapsed, the condition is not really c., and is usually very serious (perforation of an organ, acute intestinal obstruction, peritonitis, etc.), and a doctor must be sent for at once. C. may frequently be accompanied by vomiting or diarrhœa and quickening of the pulse; and it is usually classed under three heads—abdominal, renal, and hepatic c.

Abdominal C. is distinguished by a twisting pain, mainly round the umbilicus, and is often due to intestinal irritation caused by hard, undigested food. It may be due to lead-poisoning (*q.v.*), when other characteristic symptoms will be present.

Renal C. is due to the passage of a stone, or calculus, along the ureter, which leads from the kidney to the bladder. The pain is very characteristic, and shoots downwards from the loin to the thigh and testicle on the same side.

In *Heptic C.* the pain shoots upwards to the right shoulder and backwards.

and is due to the passage of a gall-stone along the bile-duct. Jaundice usually follows H. C.

COLIGNY, GASPARD DE (1519-72)' Fr. Huguenot leader; of noble Burgundian family; after much active service in Fr. army, he became colonel-general and was famous as military reformer; made admiral of France, 1552; defended Saint-Quentin in siege of 1557, and, on the town's being taken, was imprisoned and finally ransomed. Meanwhile C. had become a Huguenot. On death of Louis, prince of Condé, at Jarnac, he became leader of Prot. armies; after Peace of St. Germain he returned to court and became favorite of Charles XI. Huguenot influence at court brought reaction, and result was massacre of St. Bartholomew, in which C. was slain.

COLIMA, small Pacific state, Mexico; surface mountainous; fertile soil; on N. frontier is volcanic peak Colima, 12,750 ft.; stock-raising, coffee; area, 2,273 sq. miles. Pop. 1910, 77,704. Chief town is Colima. Pop. 25,148.

COLL (56° 37′ N., 6° 31′ W.), island, Inner Hebrides, W. coast of Mull, Scotland.

COLLAR, neckwear, in modern times usually of linen, but formerly of lawn and lace, succeeding the Elizabethan ruff; also applied to a livery or decorative badge, as the 'C. of the Garter' and other orders of knighthood. In the Middle Ages a squire was cr. by investture with a c. and spurs. Great lords and their followers were known by their rich collars, (*e.g.*) at the time of the Wars of the roses.

COLLATIA (41° 57′ N., 12° 41′ E.), ancient town, Latium, Italy.

COLLECTIVISM, modern Socialistic term signifying joint ownership and administration of capital by a community.

COLLEGE (Lat., *collegium*), originally a society, body, or corporation of persons engaged in common pursuits; a body of clergy living in common on a foundation; a society of persons joined together for educational purposes.

COLLEGE FRATERNITIES are student societies, usually secret in character. They are composed of lodges or branches affiliated to colleges, and united by a common bond of friendship and a common name, generally of Greek letters. The Greek letters usually represent a motto, supposed to be unknown to all but the fraternity's members, that indicates the aims and purposes of the organization. The lodges established in colleges are usually known as 'chapters.' The distinctive badges of the fraternities are a shield or plate of gold, displaying the society's name and symbol, worn as a pin or watch chain pendant; a monogram of letters composing the name, usually jeweled; or a symbol representing the name or some of its degrees, such as a skull, harp or key. Most of the fraternities also have distinctive colors, flowers, flags, coats of arms and other symbolic insignia, and even a complete system of heraldic devices. The emblems are sometimes used as the basis of ornamentation or design for sleeve buttons, rings, studs, charms and other forms of jewelry.

The first American college society bearing a Greek letter name was founded at the College of William and Mary at Williamsburg, Va., in 1776, and was called the Phi Beta Kappa. In 1779 a chapter was formed at Yale and Harvard and other chapters were authorized at Dartmouth, Bowdoin and Amherst. The badge is a golden key. The next society formed was the Kappa Alpha, founded in 1825 at Union college by four members of the Phi Beta Kappa and also having a golden key as a badge. Two years later the Sigma Phi and Delta Phi were established at Union College, the first with branches at Hamilton, Williams, Hobart, Lehigh, Cornell, and the universities of Michigan and Vermont, the second branching out at Columbia, Rutgers, Harvard, Johns Hopkins, Cornell, and other colleges. The other principal fraternities thereafter formed are, with their originating college and year of foundation: Alpha Delta Phi, Hamilton, 1832; Psi Upsilon, Union, 1833; Delta Upsilon, Williams, 1834; Beta Theta Pi, Miami, Ohio, 1839; Chi Psi, Union, 1841; Delta Kappa Epsilon, Yale, 1844; Zeta Psi, New York University, 1847; Delta Psi, Columbia, 1847; Theta Delta Chi, Union, 1848; Phi Gamma Delta, Jefferson, 1848; Phi Delta Theta, Miami, 1848; Phi Kappa Sigma, University of Pennsylvania, 1850; Phi Kappa Psi, Jefferson, 1852; Sigma Chi, Miami, 1855; Sigma Alpha Epsilon, University of Alabama, 1856; Alpha Tau Omega, Virginia Military Institute, 1865; Kappa Sigma, University of Virginia, 1867; Sigma Nu, Virginia Military Institute, 1869; Phi Sigma Kappa, Massachusetts Agricultural College, 1873. Of more note than any of these, due perhaps to their odd names, are the 'Scroll and Key', 'Skull and Bones' and 'Hasty Pudding', secret fraternities of Harvard and Yale Universities, composed of Senior class men.

In addition to fraternities classified

as academical or collegiate, there are a number that have become identified with specific departments of learning in which students have specialized for their future life work. These include college societies composed by students and alumni devoted to agriculture, architecture, chemistry, commerce, dentistry, drama, engineering, journalism, law, medicine, and music. College women's Greek letter societies or sororities have a like foundation and object.

COLLEGE OF THE CITY OF NEW YORK, originally the Free Academy, established in New York City by the Board of Education in 1848. In 1854 it was granted a charter by the State Legislature enabling it to assume college grade. In 1866 it was given its present name. Its courses are confined to studies leading to degrees of Bachelor, of Arts and Bachelor of Science, tuition is free to all male residents, except the summer extension courses, to which women school teachers are admitted. In 1921-22 it had a student body of 13,744 and a staff of teachers numbering 464.

COLLEGES. See UNIVERSITIES AND COLLEGES.

COLLEMBOLA, family of wingless insects, named by Lord Avebury; *Podura*, which frequents stagnant water, is common type.

COLLEONI, BARTOLOMEO (1400-75), Ital. soldier; fought in turn for Venice and Milan.

COLLEY, SIR GEORGE POMEROY (1835-81), Eng. general; killed at Majua. Butler, *Life*, 1899.

COLLIER, ARTHUR (1680-1732), Eng. philosopher; held living of Langford Magna, Wilts. from 1704; became student of Descartes; wrote *Clavis Universalis*, denying (1) that because external world seems real, it therefore is so; (2) that it is real. His thought resembles Berkeley's.

COLLIER, JEREMY (1650-1726), Anglican ecclesiastic; staunch Tory and supporter of Stewart cause, for which he got into trouble during reign of William III.; obliged to go into exile some years; wrote numerous works; attacked immorality and profanity of the stage.

COLLIER, JOHN PAYNE (1789-1883), Eng. man of letters; Elizabethan student; notorious as forger of XVII.-cent. annotations to Shakespeare folio.

COLLIER, PETER FENELON (1849-1909), publisher, *b.* Carlow, Ireland. He came to the United States in his youth and was educated at Mount St. Mary's College, Cincinnati. Later he entered the bookselling business in New York City, and founded the firm of P. F. Collier & Son, publishers. To develop his business he established a weekly journal, Once a Week, which afterwards became known as Collier's Weekly.

COLLIER, WILLIAM (1868), comedian, *s.* of Edmund Collier, tragedian, and Henrietta Engle Collier, dancer. At thirteen he was a call boy at the Lyceum Theatre, New York City, then under the management of Augustin Daly, and became acquainted with the art of Ada Rehan, John Drew, Mrs. G. H. Gilbert, Maurice Barrymore and other members of Daly's stock company. After staying with Daly for six years, becoming assistant stage manager, he played a season with his father in tragedy. In *The City Directory* he early acquired note for his amusing impersonations of Daly. He appeared in many minor roles in various comedies until 1901, from which dated his emergence as a star comedian. Richard Harding Davis wrote *The Dictator* for him, and Augustus Thomas *On the Quiet*, both of which were great successes. He took a leading part with George M. Cohen in *Hello, Broadway*; and also starred in *Take My Advice*; *A Little Water on the Side*; *Caught in the Rain*; and *Who's Who*.

COLLIER, WILLIAM MILLER (1867), diplomat and lawyer, *b.* Lodi, N. Y. He was admitted to the bar in 1892 after graduating from Hamilton College and studying at the Columbia College Law School. His legal activities embraced serving as a referee in bankruptcy for the Northern District of New York in 1898; lecturer on the law of bankruptcy at the New York Law School from 1903 to 1905; special assistant attorney general of the U.S. Department of Commerce and Labor; and general legal counsel and diplomatic agent for various American corporations in Europe. From 1899 to 1903 he was president of the New York Civil Service Commission and from 1905 to 1909 United States Minister to Spain. He wrote several works on bankruptcy and trust law.

COLLINGWOOD (44° 30′ N., 80° 20′ W.), town, Ontario, Canada; lumber, grain. Pop. 6,000.

COLLINGWOOD (37° 50′ S., 144° 50′ E.), city, on Yarra-Yarra, N.E. suburb of Melbourne, Australia. Pop. 33,000.

COLLINGWOOD, CUTHBERT COLLINGWOOD, BARON (1750-1810), Brit. naval commander, *b.* Newcastle-on-Tyne; served in Amer. War, 1774; he was at the battle of Cape St. Vincent, 1797;

made vice-admiral, 1799, and went to the Mediterranean; most celebrated for his part in the victory of Trafalgar, where he led one line of ships, in the Royal Sovereign. He was cr. baron just afterwards.

COLLINS, JAMES HIRAM (1873), *b.* in Detroit, Mich. Public school education. After learning the printers trade, traveled as a journeyman, at one time with a circus. In 1907 became connected with the Saturday Evening Post as correspondent and in that year and again in 1910 made trips to Europe to investigate business. Volunteered with U.S. Food Administration in 1917 and was associated with the publication dept. of the Commission of Public Information. In 1918 was with the Emergency Fleet Corp. and finally was assistant to Edward N. Hurley of the U.S. Shipping Board. Was correspondent for the Philadelphia Public Ledger in South America in 1919. Author: *Human Nature in Selling Goods*, 1909; *The Art of Handling Men*, 1910; *The Great Taxicab Robbery*, 1912; and *Straight Business in South America*, 1920.

COLLINS, JOHN CHURTON (1848-1908), Eng. author; prof. of Eng. Lit., Birmingham; a voluminous writer on literary subjects, and a good critic.

COLLINS, MICHAEL (1890-1922), an Irish soldier and political leader, *b.* in Clonapilty, County Cork, Ireland. He served in the government post office service during his youth but early took an active part in the political discussions in Ireland and in the years preceding the World War. He enlisted at the outbreak of the war and served in the British Aviation Corps. In 1916, however, he was active in the so-called rebellion in Dublin, but escaped the fate of the other leaders in that movement by remaining in hiding. A price was set on his head by the British Government but he succeeded in eluding all efforts to capture him. He recognized the impossibility of securing the independence of Ireland and upon the offer of Lloyd George to amnesty all political offenders during the discussion of the proposed arrangement between Great Britain and Ireland, he was one of the delegates and signed the provisional treaty or agreement in 1921. As commander of war and premier, he exercised during 1921-22, practically dictatorial powers in Ireland and relentlessly pursued those who were attempting to set up an independent republic. During the riots in Dublin, Cork and other cities in 1922, he commanded in person the forces of the Free State. He was assassinated after riding into an ambush while on his way in a motor car from Cork to visit other points in which hostilities were in progress. His loss was a great blow to the Free State as he was recognized as the strongest figure in the government.

COLLINS, WILLIAM (1787-1847), Eng. artist; painter of genre pictures; A.R.A., 1815; R.A. 1820; *f.* of Wilkie C., novelist.

COLLINS, WILLIAM WILKIE (1824-1899), English novelist, *b.* London, Eng., better known as Wilkie Collins. He was the *s.* of a landscape and portrait painter. In his youth he lived for some time in Italy and later became a clerk with a London firm of tea merchants with a view of embarking on a business career. From that sphere he passed to the law, and was admitted to the bar in 1851. Art and literature meantime attracted him, and he finally met Dickens, an acquaintance which shaped his future work. He had already written a romance, *Antonina, or the Fall of Rome*, and *Rambles Beyond Railways.* Thereafter he was a frequent contributor to Dickens' Household Words and All the Year Round. He wrote several novels (some in collaboration with Dickens), and numerous short stories, but it was not until 1860, when his *Woman in White* appeared, that he became preeminent as a novelist. Another of his famous books is the *Moonstone*, published in 1868. Collins visited the United States in 1873 and 1874 and gave readings from his works. Several of his books were adapted into plays and gained great stage popularity on both sides of the Atlantic.

COLLINSVILLE, a city of Illinois, in Madison co. It is on the Vandalia railroad, and is the center of an important coal, lead, and zinc mining region. Its industries include the manufacture of flour and wool. There is a hospital and a sanitarium for tuberculosis. Pop. 1920, 9,753.

COLLODION, viscid fluid made by dissolving gun-cotton or pyroxylin in a mixture of alcohol and ether; the evaporation of the solvents leaves a tenacious film; used in preparation of photographic films, and in surgery as a coating for wounds.

COLLOIDS are gelatinous substances, such as glue or starch, or albumen and silicic acid, when combined with water in certain proportions. The term was devised by an English chemist, Thomas Graham, to specify substances that were not wholly diffusable, having no porosity in their constituents. A colloid is thus different from salt, sugar or mineral acids, which diffuse readily through their organic membranes. Colloids and their properties are closely related to biology; the structure of protoplasm, that is, the combination of chemical matter of which the cells of living organisms are made, is the product of colloidal action. Colloidal solutions are of two types, known as emulsoids and suspensoids. The first is viscous and gelatinizing and includes many organic substances, such as gelatine, that can be dissolved readily in the medium. Suspensoids are non-viscous and non-gelatinizing and include solutions of various metals that require special laboratory treatment. Colloidal chemistry evolves products used in a wide scientific and industrial field. They figure in the fabrication of many small wares in which celluloid, paper or rubber is the material used. Colloids are also invaluable in photography, metallurgy, ceramics, tanning, dyeing, the manufacture of soap, artificial silk, sugar, explosives and cement and varnish, as well as in cooking.

COLLUSION, legal term for compact made by two people that, for improper purposes, one should bring an action against the other.

COLLYER, ROBERT (1823-1912), Amer. divine, Methodist, then Unitarian; famous preacher and anti-slavery worker.

COLMAN, GEORGE (1732-94), Eng. dramatist and scholar; wrote *The Clandestine Marriage*, *The Jealous Wife*, etc.; also trans. from Terence and Horace.

COLMAN, GEORGE, THE YOUNGER (1762-1836), Eng. dramatist; *s.* of above; author of *The Heir at Law* and other popular and amusing dramas; examiner of plays (1824-36).

COLMAN, ST. (*d.* 676), bp. of Lindisfarne, 661; then in Iona and Ireland.

COLMAR, KOLMAR (48° 6′. N., 7° 19′ E.), town, France; capital of Upper Alsace; became imperial city, 1226; Fr. possession, 1681-1871; center textile weaving. Pop. 45,000.

COLNE (53° 53′ N., 2° 10′ W.), market town, Lancashire, England; textiles. Pop. 25,000.

COLOCYNTH, BITTER APPLE (*Citrullus colocynthis*), plant belonging to natural order Cucurbitaceœ; c. of commerce is prepared from the dried and pealed fruit; acts on the liver and gall-bladder as a biliary stimulant; used generally combined with other drugs, a drastic purgative. The active principle is colocynthin ($C_{56}H_{84}O_{23}$).

COLOGNE, or KÖLN, town, Rhineland, Germany (50° 56′ N., 6° 56′ E.), on Rhine; one of principal western fortresses of Germany. From its position at head of Rhine navigation for seagoing vessels, as center of rail and river systems, and being near rich coal and iron fields, Cologne has great commercial importance; archiepiscopal see; has magnificent Gothic cathedral, built between 1248 and 1447, but not completed until 1880; several other fine churches, Gothic town hall, Gürzenich Hall, Temelhaus, and other interesting buildings; zoological and botanical gardens; manufactures cottons, woolens, beet sugar, chemicals, spirits of wine, eau-de-Cologne, tobacco, machinery, chocolate, carriages, porcelain, soap. Cologne was Roman colony in reign of Claudius; taken by Franks in V. cent.; annexed to Ger. Empire in IX. cent.; great trading center in Middle Ages, and powerful member of Hanseatic League; univ., founded 1389, was famous in XV. cent.; gradually declined, and ceased to exist after foundation of Bonn Univ., 1797; taken by French, 1794; restored to Prussia, 1814. After armistice that concluded the World War, Cologne was held by Allies as a bridgehead, and became headquarters of Brit. army of Rhine. Main body of General Plumer's troops crossed the river Dec. 13, 1918, and the complete bridgehead, east bank of Rhine within a radius of 30 kilometres from Cologne, was occupied before Christmas of that year. Pop. 516,520. about 80 percent. R.C.

COLOGNE WATER. See PERFUMES.

COLOMBES (48° 56′ N., 2° 14′ E.), town, 7 miles N.N.W. of Paris, France; petroleum refineries; vinegar. Pop. 25,000.

COLOMBEY (49° 6′ N., 6° 18′ E.), village, Lorraine, France; scene of battle between Germans and French, Aug., 1870.

COLOMBIA, republic, S. America (6° N., 74° 30′ W.); bounded N. by Panama, Caribbean Sea, Venezuela; E. by Venezuela, Brazil; S. by Ecuador; W. by Pacific. Extreme length, 950 m.; width, 640 m. From Pasto in S.W. corner Cordilleran ranges spread out like ribs of fan; along Pacific coast Cordillera de Chocó is low, and valley to E. is drained S. to Pacific by San Juan river, N. to Atlantic by Atrato. Main ranges are Western, Central and Eastern Cordilleras; intervening valleys drained by Cauca and Magdalena rivers. These valleys are richly wooded. The great unhealthy, swampy plains or llanos in E. are drained by head-waters of Orinoco. Several rivers are navigable, or partly so.

Climate varies greatly, ranging from tropical to arctic conditions; rainy season, Oct. to Dec.; dry season, Dec. to Feb. Most of inhabitants live on plateaus, which are treeless but well-watered prairies, of which those of Antioquia and Bogotá are the most important. Cap. Bogotá, stands on latter, 8,694 ft. above sea-level. The country is subject to earthquakes.

Lower levels produce rice, sugar-cane, bananas, indigo, resins, rubber, copaiba, cocoa, maize, vegetables, ivory, dyewoods, medicinal plants; in more temperate zone are found cinchona tree, coffee, figs, while higher up, wheat, other grains, and potatoes are cultivated; on llanos in E. cattle are reared. Country is rich in minerals, gold, coal, iron, salt, copper, lead, platinum, zinc, antimony, sulphur, cinnabar, rock salt, arsenic, marble, lime, gypsum, petroleum, emeralds; valuable pearl fisheries along coast. Manufactures include pig-iron, rails, castings, sugar, sheeting, candles, soap; exports—coffee, hides, cotton, bananas, Panama hats, drugs, gold, silver, platinum; imports clothes, flour, lard, petroleum, cotton goods, machinery, matches. Railway mileage is 740.

History.—Original inhabitants of Colombia were Indians, some of whom at time of coming of Spaniards were partially civilized, while others were still in primitive condition. Spaniards first appeared in first half of XVI. cent.; in 1525, Bastida established their first settlement at Santa Marta, and eight years later another was made by Heredia at Cartagena; he made several successful expeditions in search of gold. Queseda took Bogotá, 1537, the capital of the Chibcha tribe, and named the surrounding district, New Grenada. New Grenada was at first incorporated with Peru, but attained separate existence in 1564, when it became a presidency. For nearly two hundred years Indians were cruelly oppressed by Span. conquerors; one-seventh were forced to work in mines as slaves under wretched conditions; but in 1729 slavery was abolished. In 1740, New Grenada was for the second time made a vice-royalty—it had been one for a short time from 1718—and so continued until it attained independence in 1810. Principal events under Span. rule were introduction of Inquisition; importing of negroes from Africa to supersede Indians in mines; attacks by English, French, and other nations. The viceroys, by tyrannical and unjust measures finally drove people to insurrection in 1810, when revolution occurred, Bogotá first declaring independence. War now ensued; lasted nine years before Spaniards were finally overcome; leader of rebels being Simon Bolivar, a Spaniard, and liberator of Colombia, Panama, Venezuela, and Ecuador, which he unified as Republic of Colombia. At his death they again separated, and Colombia and Panama became Republic of New Granada. Santander was first president; administration of his successor, Obando, was marked by first of succession of civil wars and administrative changes. Panama seceded from republic, 1856; Antioquia, 1857. In 1861 occurred another change, and republic was now called United States of Colombia; this lasted till 1886, when it again became Republic of Colombia. Revolts occurred in 1895 and 1900, latter resulting in civil war, which lasted till 1903. Panama again seceded in 1903, in time of Marroquin's administration.

In 1914 Colombia recognized independence of Panama, and received certain rights in the Panama Canal zone. There are still frontier difficulties with Peru; but in 1917 a frontier treaty was signed with Ecuador. Government is by president, with Congress consisting of senate and house of representatives. Senate has 34 members, house of representatives 92 members, who are elected by popular vote for four years. The president holds office for four years.

Inhabitants include Spaniards, Indians, negroes, and many cross-breeds; there is little race animosity, probably because the graduations between white and colored are too fine for distinction. Chief religion is R.C.; education free, but not compulsory. Military service is compulsory; no navy. Area, 440,846 sq. miles. Pop. 5,071,100.

COLOMBIER, PIERRE BERTRAND DE (1299-1361), Fr. cardinal.

COLOMBO (6° 56′ N., 79° 59′ E.), capital and principal seaport, Ceylon, on W. side of island; extensive trade; magnificent artificial harbor; port of call for Eastern steamers; coaling station; seat of R.C. and Anglican bp's; many fine buildings; Portug. settlement, 1517; taken by Dutch, 1656; by British, 1796; spices, fibres, tea, and coffee. Pop. 90,000.

COLON.—(1) Anatomical term denoting the part of the large intestine extending from the cæcum to the rectum; (2) in punctuation, the mark (:) used to separate parts of a sentence complete in themselves, but less independent than a full stop (.) would denote.

COLON, ASPINWALL (9° 23′ N., 79° 23′ W.), seaport, Panama, on Limon Bay, W. side of Manzanilla Island; spacious harbor; Atlantic terminus of Panama railway and Panama canal; U.S.A. control sanitation and quarantine. Pop. 19,300.

COLON (22°43′ N., 80° 45′ W.), town, Cuba; sugar.

COLONIAL DAMES OF AMERICA, a patriotic body of American women, dating from 1891 and 1892. It was founded to preserve the traditions and records of the Colonial period and the Revolution, as embodied in manuscripts, relics and buildings; to promote the celebration of historic events; to ventilate information regarding American history; to perpetuate the heroic deeds and worthy memory of the colonists; and to cultivate partriotism. Members must have at least one ancestor who lived in America before 1750 and who rendered worthy service to the colonies. The organization is composed of a Colonial Society from each of the thirteen original States, a society from the District of Columbia, and an associate society from each of the non-colonial states. The Colonial Dames have been instrumental in restoring churches and colonial houses of historical importance; marking historical sites with tablets; and promoting prize essays on patriotic and historical subjects by pupils of public schools and colleges. Its members number about 9,000.

COLONIAL WARS, SOCIETY OF, a patriotic organization formed in 1892 to perpetuate the heroic names and deeds of participants in American colonial wars, and to preserve records and documents of the period. Members must be descended from an ancestor who served as an army or naval officer, soldier, sailor, or marine, or as a privateersman, either under the authority of the colonies, or in the forces of Great Britain which participated with those of the colonies in any wars from the settlement of Jamestown to the battle of Lexington; or an ancestor who held public office in the colonial period. The various state societies united with the general society have a membership approaching 5,000.

COLONNA, one of the most important families in Rome from the XII. cent. onwards; in frequent strife with other houses; still exists.

COLONNA GIOVANNI PAOLO (*d.* 1695), Ital. composer of church music.

COLONNA, VITTORIA (1490-1547), Ital. poet; famous for her amatory and elegiac poems, and blamelessness of her life in a corrupt age; devoted wife of Marquis of Pescara; held in great estimation by Michael Angelo.

COLONSAY (56° 4. N., 6° 12′ W.), island, Inner Hebrides, Scotland; close to isle of Oronsay, landing place of St. Columba, 563.

COLONY, foreign possessions of any country. The Greeks were enterprising colonists, and their c's extended from Crimea to Spain; they were virtually independent, and had strong sense of liberty; Rom. c's were military in origin, and consisted of families and troops planted in newly acquired territory.

The modern c. is land inhabited mainly by emigrants and descendants of the early settlers; some of them are almost self-sufficient though their manufactures are still limited.

COLOPHON, ancient city, on coast of Asia Minor; 15 miles N.W. of Ephesus; and reputed birthplace of Homer.

COLOPHON. See Book.

COLOR.—Bodies owe their color to the light which they reflect. White light is made up of the many c's, and if it falls on a green body all the colored rays except green are absorbed by the body, while the green light is reflected. A plate of red glass allows red light only to pass through. Colored rays differ only in the frequency of ether vibrations which they set up, and the structure of the retina enables the eye to distinguish between these. Blue and yellow paints when mixed are green, because green rays are the only rays reflected by both and not absorbed by either.

Complementary c's are any two which combine to make white, *e.g.* blue and yellow, red and green. *Primary* c's are the chief c's of the spectrum; they are red, orange, yellow, green, blue, indigo, violet (Newton's theory); red, blue, and green (Young-Helmholtz theory).

COLORADO, W. central state of U.S. (37°-41° N., 102°-109° W.), bounded N. by Wyoming and Nebraska; E. by Nebraska, Kansas; S. by Oklahoma, New Mexico; W. by Utah. Surface shows two natural divisions—great plains in E., mountains in W., where Rocky Mts. cross the state in several ranges, of which most important are Front, Park, and Saguache; highest peaks—Mt. Elbert, Mt. Harvard, Pike's Peak, all over 14,000 ft. Chief rivers are Grand with affluent Gunnison in W., Arkansas and S. Platte with their affluents in E., all affording much potential water-power. Between some of the mountain ranges are valleys called parks, occupying sites of former lakes. Climate varies with elevation; generally healthy; rainfall slight. Cap. Denver.

Colorado is pre-eminently a mining country; produces immense quantities of gold and silver; large deposits of lead, zinc, iron ore, copper, anthracite, and bituminous coal; also produces petroleum, bismuth, mica, tungsten, and radium. Mineral springs occur in various places. Agriculture has improved since development of system of irrigation; wheat, oats, maize, barley, potatoes, hay produced; fruits and vegetables grown; sugar-beet is largely cultivated. Horses, cattle, sheep, and pigs raised in considerable numbers. Industries include metal smelting and refining, meat packing, flour milling, dairying, manufacture of machinery, cars, beet-sugar. Railway mileage in 1916 was returned as 5,803.

History.—Colorado was originally inhabited by Indians, traces of whom remain in form of cave-dwellings; explored in part by Spaniards in 18th cent.; about half of district bought from France by U.S. 1804; explored by Amer. travelers, Pike and Long, in early 19th cent.; western part belonged to Mexico till 1848, when it was ceded to U.S.; almost unknown when discovery of gold in 1859 resulted in great influx of colonists and foundation of towns of Denver and Boulder; organized as territory in 1861; admitted as state to Union, 1876. Senate consists of thirty-five members, house of representatives of sixty-five members; former elected for four years, latter for two; executive is in hands of governor, assisted by lieut.-gov. and five officials; represented in Congress by two senators and four representatives. Education is state-controlled and compulsory and is of a high order of excellence. Inhabitants include whites, Chinese, Indians, negroes. Area, 103,948 sq. m.; pop. 1920, 939,629.

COLORADO BEETLE, or potato bug, the chief foe of the potato plant. Its native region was the Rocky Mountains, where it was confined until the cultivation of potatoes reached that territory. Since civilization provided it with a new food, the beetle, once content to feed upon the sandbar of its habitat, took on a new life, and underwent a remarkable migration and fecundity, appearing almost everywhere potatoes were cultivated. It traveled from field to field, subsisting on potato vines. By 1859 it had spread east and neared Omaha; then entered Iowa, crossed the Mississippi and swarmed over Illinois into Indiana and Ohio. It invaded Ontario in 1870. A little later the bug spread over New York, Pennsylvania, District of Columbia, Connecticut, New Jersey, Delaware, Maryland, and Virginia. It also spread south, propagating in Mississippi and Georgia. It is solely a product of North America and has not established itself elsewhere. The female beetles, which winter underground or under any shelter, deposit their eggs upon the young potato plants as soon as they appear above ground. The larva hatch in less than a week and become beetles about a month after. Three or four generations are produced each year. Arsenical poisons, such as Paris green, either sprayed or dusted over the plant, readily restrain the potato bug's ravages.

COLORADO RIVER (32° 4′ N., 114° 25′ W.), river, South-Western U.S.A.; formed by union of Green and Grand Rivers; Green, the more important headstream, rises in Wyoming, joins Grand S.E. of Utah. C. flows S.W. through elevated tableland and southern part of Utah into Arizona; afterwards separates Arizona on E. from Nevada and California on W.; enters Gulf of California; course forms several remarkable canons of great depth; *Grand Canon* of the C. (attaining height of 6,000 ft.) extends over 200 miles in length; total length of river, 2,000 miles.

COLORADO RIVER (*c.* 39° S., 64° W.), river, Argentine Republic, S. America; rises in eastern slopes of Andes; flows generally S.E. to Atlantic.

COLORADO SPRINGS, a city of Colorado, in El Paso co., of which it is the county seat. It is on the Denver and Rio Grande, the Atchison, Topeka and Santa Fe, the Chicago, Rock Island, and other railroads, 70 miles S. of Denver. Its elevation, 6,000 feet above sea level, and the dryness of the air, make it a favorite health resort for those suffering from lung troubles. In the neighborhood are several of the most important gold mines of the State. The public institutions include Colorado College, St. Francis' Hospital, State School for Deaf Mutes, Union Printers' Home, and several sanitariums. There are several parks and many handsome public buildings. The city is connected by electrical railway with neighboring towns. Pop. 1920, 29,572.

COLORADO STATE AGRICULTURAL COLLEGE, a co-educational institution situated at Fort Collins, Colorado. It was established in 1876 on a land grant of 90,000 acres bestowed by Congress, and opened in 1879. The college provides instruction in agriculture and related subjects, also in engineering, architecture, domestic science, commerce, military science, music, oratory, and veterinary science. It has an agricultural station supported both by federal and state appropriations. In 1922 it had a student roll of 750 and a teaching staff of 77 headed by C. A. Lory.

COLORADO, UNIVERSITY OF, a co-educational State institution of learning situated at Boulder, Colo. It was opened in 1877 shortly after Colorado was admitted to statehood. Its first departments were preparatory and collegiate. Later a College of Liberal Arts was added and the normal and preparatory departments were discontinued. The present university includes colleges of commerce, education, engineering and pharmacy, schools of social and home service, medicine, law and the graduate school, a training school for nurses, a summer session, and an extension division. In 1922 the students numbered 2,715, and the teachers 200, under the presidency of George Norton, Ph. D.

COLOR BLINDNESS or **ACHROATOPSIA**, is characterized by inability to differentiate between certain colors or shades of colors. This is caused by defective structure either of certain brain cells in the visual regions or of the nerve endings, the rods and cones of the retina. Achroatopsia is now recognized as a heritable, sex-linked characteristic, affecting about 3-4% of males and 1% of females, and is often accompanied by defective sight, usually hypermetropia.

To color-blind persons, the spectrum is shortened, usually at the red end, which has the effect of making red appear as green, and green as red.

There are three classes of color-blindness: (1) that in which there is a light as well as a color loss. (2) that in which the perception of light is normal but the perception of color is defective. (3) that in which there is a defective perception of color owing to an abnormality of the central region (fovea) of the retina. A color blind person is necessarily barred from certain occupations which require a correct sense of color. Applicants for the Navy and merchant marine as well as locomotive engineers and motormen are carefully examined for these defects, since failure to recognize a colored signal may be the cause of a serious accident.

COLORS, MILITARY, flags borne by regiments. They correspond to the *vexillum* of Rom. armies, and the 'banner' of the feudal lord. They developed on modern lines in the XVIII. cent.

COLOR PHOTOGRAPHY is the method of reproducing a photographic image in natural colors. No satisfactory method has as yet been devised for making a permanent reproduction on paper or other fabric by photography alone, although several methods are available for making colored transparencies, lantern slides and motion pictures. The most interesting of these is the following process, perfected by M. Lumbiere.

The plate consists of two coatings. The one is a color screen, consisting of a homogeneous mixture of orange, red, green and violet dyed starch grains, so proportioned that the mixture appears colorless. It is varnished for protection. The second coating is the usual panchromatic light sensitive film. In making the exposure the lens must be fitted with a color filter adapted to the particular light used. The plate is so placed that the starch grain color screen faces the lens; thus the light rays pass through it before reaching the photographic film. The latter is developed in the usual way, and the image reversed by chemical and light treatment so as to form a positive. This is the transparency or lantern slide. The dyed starch grains have remained unchanged during the process and they supply its natural colors to the image.

When making colored motion pictures, the film (which is a panchromatic one, and sensitive to all colors), is exposed in a special camera, fitted with a three section light filter in front of the lens. This is so geared to the shutter of the camera that an exposure is made through sections of the screen. These sections permit red, green, and violet rays to pass successively, so that one exposure records only the reds, the second the greens, and the third the violets; then the cycle starts again with the reds. The record on the film is not in color, but is in a scale of greys. The film is developed and a positive prepared in the usual way. For projection a revolving three-part color screen is again used, which must be so synchronized with the film, that the proper picture is projected through the correct screen. The pictures, as flashed on the screen, consist of a red, followed by a green and a violet. The film however, is run about three times as fast as the ordinary black and white, and consequently the eye does not have time to register an image of the various simple colors, but sees only the composite which appears to be in natural colors.

There are several other methods of producing color transparencies. That by optical interference attains its effect in much the same way as the hues of soapbubbles, oil films, and mother of pearl are produced. In the three—color process, perfected by Frederick C. Ives, three negatives are made through respectively, red, yellow and blue screens. They are then developed and placed in an apparatus, which simultaneously illuminates them by rays of the same color as was the screen through which they were made, and superimposes their images by reflectors. The resulting combined image reproduces the subject in its natural colors.

COLOR PRINTING is that branch of printing which reproduces characters, designs, illustrations, etc., in more than one color. The earliest example of this art was produced by Johan Fust in *The 1457 Psalter*, in which the initial letters were illuminated in red and blue. In 1486 the *Book of Coat Armour* appeared with red, blue and brown illustrations, made from wood cuts. These were prepared by inking the various sections of the wood cut with colored inks, the whole illustration being printed with one impression. Printing in color from copper plates, was the next advance, workers in the 17th cent. using one color and black; the balance of the colors were added laboriously by hand. The three-color mezzo-tint process, developed by J. C. LeBlon, and the method, devised by Robert Laurie of applying three colored inks to a stippled engraving plate, were the great contributions of the 18th century. In the following decades, many paintings were reproduced by the wood block process; some of these were composed of as many as thirty colors. About this time lithography was adapted to illuminated work. Not until 1848, however, was the fact realized that more complete and satisfactory coloring could be effected with fewer impressions, by the superimposition of colors than was possible by the older method, whereby each section of the print received only one impression of a single shade. The color sensitive plate was unknown at this time, so that the various imprints on the lithographer's stone had to be made laboriously by hand, or the method of Niepce resorted to. This consisted in passing light through the photographic plate or drawing to be reproduced, placed in contact with a light sensitive film of asphaltum and oil of lavender on the stone. The exposure renders the parts acted upon by light insoluble and they will remain on the stone while the balance of the film is dissolved out in hot water. The remaining portions are inked and impressions taken in the usual way. This chromo-lithographic process was the first truly scientific contribution to the art.

Later, when photography had been applied to lithography (black and white printing), Wm. Griggs suggested three color chromo-lithography which was quite successful. The Collotype, developed by Vogel in the latter part of the 19th century was due to his color-sensitive photographic plate, and was the forerunner of the present day processes. Great advances were made by Ubrich, Kurtz and Ives and by the development of good color sensitive photographic plates and color screens.

At present most color work is done by transferring from photographic images to the lithographer's stone, or to flexible aluminum plates (used in the rotary press). Several photographs of the subject are taken, using plates sensitive to the various colors. They are then developed and printed on a bichromated gelatine film on the stone or aluminum plate, and such parts of the film as have not been affected by the light are dissolved by hot water. After the film is inked with the proper color it is ready for use. Three or more such plates are prepared, each inked with its own color and the impressions transferred to the paper one over another thus giving the finished print. Great care must be exercised in the use of properly colored inks and in getting each impression in register.

COLORS. See COAL TAR.

COLOSSÆ city, on Lycus, Phrygia; important in ancient times; site of Early Christian church to which Paul wrote his epistle.

COLOSSEUM, the name given to a celebrated ampitheatre in Rome, one of the most important monuments of Roman antiquity. It was begun by Vespasian, finished in A.D. 80 by Titus, and was known originally as the Flavian ampitheatre, Flavius being the family name of these two emperors. The name C. was first employed by Bede in the 8th century, in reference no doubt to its colossal size; it was the colossal building *par excellence*. The C. was used for combats of gladiators and wild beasts; after the shows the arena was often filled with water and used for nautical displays. It is now in ruins—a gigantic stone carcass. Several times ravaged by fire and always restored, it served the barbaric pleasures of the Romans until the end of the 6th century. Since then it has suffered pillage at the hands of the barbarians, has been used as a fortress by brigands of noble Roman family, has been transformed into a huge quarry, marble for the Forum being calcined there in lime-kilns, and its own stones have been carried away for building purposes. Pope Benedict VIII. saved it from further devastation by consecrating it to the memory of the Christian martyrs and by erecting crosses and oratories within its walls. Popes Pius VII., Leo XII., and Pius VIII. have further preserved it by buttressing the walls, etc. In form the C. is an ellipse whose axes measure about 612 ft. and 515 ft.; its height is 160 to 180 ft., and the arena about 250 ft. by 160 ft. It is estimated to have held seats for 87,000 persons and standing room for 20,000 more.

COLOSSIANS, EPISTLE TO THE, one of the Pauline Epistles; early evidence in its favor is supported by critics, who are less inclined than formerly to deny its genuineness. The purpose of writing was to counteract the effects of a heresy which had considerable influence there, but what exactly it was is unknown—probably some Judaizing tendency, tinged with Oriental speculation.

COLOSSUS, name for statues of immense size, and particularly the bronze statue of Helios, 70 cubits in height (over 100 ft.), which stood near Rhodes harbor. Erected about 280 B.C., it was thrown down by an earthquake some 60 years later.

COLQUHOUN, ARCHIBALD ROSS (1848-1915), British explorer and administrator; *b.* off the Cape of Good Hope. He entered the service of the India government in the Public Works Department in 1871 and was appointed a member of the British Mission to Siam in 1879. A proposed railway route between Burmah and China was the occasion for his exploring the territory from Canton to Bhamo in 1881-82. Three years later he became deputy-commissioner of Upper Burmah, serving until 1889. In 1895 he explored the Nicaragua and Panama Canal routes, then revisited China, traveling from north to south, and also in Mongolia and Siberia. He became administrator of Mashonaland, South Africa, in 1900-2. His writings, which relate to his travels and administrative work, embrace works on English policy in the Far East, China, South Africa, India, and the Pacific.

COLT, LE BARON BRADFORD (1846), U.S. Senator and jurist; *b.* Dedham, Mass. After graduating from Yale in 1868 and from the Columbia Law School two years later, he practiced law in Chicago, Bristol and Providence, R. I. He was a member of the Rhode Island House of Representatives from 1879 to 1881, when he was appointed U. S. district judge for that state. In 1884 he was made a United States circuit judge, retiring in 1913, upon being elected to the United States Senate for the 1913-19 term. He was re-elected for the term ending in 1925.

COLT, SAMUEL (1814-62), Amer. inventor of the revolver, the first model for which he made as a boy. Patented and put on the market in 1837, the weapon only began to be appreciated in 1847, when, through General Zachary Taylor, the Amer. Government ordered a supply for the Mexican wars: subsequently millions were manufactured in Colt's factories.

COLTON, ARTHUR WILLIS (1868), *b.* in Washington, Conn. Graduated from Yale in 1890, Ph.D., 1893. Was instructor in English literature at Yale from 1893-5 and in 1906 became Librarian of the University Club in New York City. Besides contributing to magazines he was the author of *Bennie Ben Cree*, 1900; *The Delectable Mountains*, and *The Debatable Land*, in 1901; *Tiboa*, 1903; *The Belted Seas*, 1905; *The Cruise of the Violetta*, 1905, and *Harps Hung Up in Babylon*, in 1907.

COLT'S - FOOT (*Tussilago Farfara*), plant of order Compositæ, with yellow flowers, common in England; leaves are sometimes smoked for asthma.

COLUGO, FLYING LEMUR (*Galeopithecus*), order of arboreal vegetarian mammals of the Malay Archipelago and Philippines, about the size of a cat, and sometimes classified with the Insectivora. Their fore and hind-limbs are connected with a broad fold of skin which serves as a parachute with which the animals can effectively glide through the air from tree to tree.

COLUM, PADRIAC (1881), *b.* in Longford, Ireland. Public school education. Was at one time editor of the Irish Review and was one of the founders of the Irish National Theater. Came to the United States in 1914. Was a lecturer on Irish literature and poetry and besides contributing to the New Republic, The North American Review and other publications he edited (with E. F. O'Brien), *Poems of the Irish Rev. Brotherhood* and in 1921 *The Anthology of Irish Poetry.* Author: *Wild Barth* (poems), 1907; *My Irish Year*, 1912; *A Boy of Erin*, 1913; *Three Plays and The King of Ireland's Son*, 1916. *Mogue the Wanderer* (play), 1917; *The Adventures of Odysseus and the Tale of Troy*, also *The Boy Who Knew What The Birds Said*, 1918; *The Girl Who Sat by the Ashes*, 1919; *The Children of Odin*, 1920; *The Boy Apprenticed to an Enchanter*, 1920, and *The Golden Fleece* in 1921.

COLUMBA, ST. (521-97), spent his early life in Ireland; in 563 came to evangelize Scotland, founding a monastery at Iona, where he *d.*; he did noble work among the Picts, though his life has been overgrown with myth.

COLUMBIAN, ST. (543-615), *b.* Ireland; preached in Switzerland and Italy.

COLUMBIA, DISTRICT OF. See WASHINGTON.

COLUMBIA, a city of Missouri, in Boone co., of which it is the county seat. It is on the Wabash and the Missouri, Kansas and Texas railroads. It is the center of an important fruit growing and stock raising community and is also important industrially, having manufactures of lumber, elevators, and meat products and shoes. The city has several educational institutions, including the University of Missouri, Christian College, Bible College, and Stephens College. There are also several institutions for the education of women. There is Memorial Hospital, and a U.S. Government Weather Station. Pop. 1920, 10,681.

COLUMBIA, a city of Pennsylvania, in Lancaster co. It is on the Philadelphia and Reading, and Pennsylvania railroads, and on the Susquehanna River and Susquehanna Canal, 10 miles west of Lancaster. The river here is crossed by a bridge connecting with the city of Wrightsville. This is one of the longest bridges in the United States. Columbia is the chief trade center for the surrounding counties and its industries include silk and lace mills, sugar refineries, iron works, and brush factories. Electric railways connect it with nearby towns. It is the seat of the Franklin and Marshall College and has a convent school and a public library. The city was founded in 1726 by Quakers and in 1789 was one of the places voted for the National capital. A bridge crossing the Susquehanna was burned in 1863 to prevent the Confederate army marching on Philadelphia. Pop. 1920, 10,836.

COLUMBIA, a city of South Carolina, the capital of the State. It is in Richland co., of which it is the county seat. The city is on 5 railroads, the Columbia Canal and the Congaree River. It is built on a bluff, 15 feet above the river. It is an important city industrially and has manufactures of cotton, fertilizers, lumber, iron, etc. Abundant water power is furnished by the river. Its most notable buildings are the State House, State Penitentiary, Insane Asylum, U. S. Government Building, and city hall. It is the seat of the University of South Carolina, College for Women, Lutheran Seminary, and a Presbyterian Theological Seminary. Columbia was founded in 1786 and it was the first meeting place of the State Legislature. A large part of the city was burned by the Federal army during the Civil War. The old State house and other buildings were destroyed. Pop. 1910, 37,534.

COLUMBIA, a city of Tennessee, in Maury co. It is on the Louisville and Nashville, the Nashville, Chattanooga and St. Louis, and other railroads, and on Duck River. It is surrounded by an important agricultural region and also has industries of value. These include manufactures of flour, lumber, marble, phosphates, etc. There is a courthouse, library, and several educational institutions. Pop. 1920, 5,526.

COLUMBIA, BRITISH See BRITISH COLUMBIA.

COLUMBIA RIVER, OREGON (46° 10′ N., 123° W.), large river, N. America, 1,400 miles long; rises in Brit. Columbia, on western slope of Rocky Mountains; flows irregularly, generally S.W., through Washington; forms part of N. boundary of Oregon and Washington; enters Pacific; principal affluents, Clark's Fork and Snake River; navigation interrupted by numerous falls and rapids, but by steamers and intermediate railways goods can be conveyed a distance of 500 miles up; salmon fisheries.

COLUMBIA UNIVERSITY, one of the leading seats of learning in the United States, situated in New York City. It was established in 1754 by royal charter under the name of King's College, and began with a class of eight pupils in the schoolhouse belonging to Trinity Church. The following years the college obtained a parcel of land from the church trustees and thereon erected its first building. The Revolutionary war and its effects halted its progress. It was closed for eight years and reopened in 1784 under the name of Columbia College. The institution moved uptown with the city's growth from the downtown section, and in 1897 became established on its present notable site at Morningside Heights, where the buildings and grounds cover some 27 acres. It was organized as a university and in 1912 became vested with that designation by the State Supreme Court.

In its growth Columbia established a law school, 1858, and a school of mines, 1864. In 1900 Barnard's College for Women and Teachers' College became parts of the university's educational system, and in 1904 the New York College of Pharmacy was added. The faculties and schools also include the College of Physicians and Surgeons; schools of architecture, chemistry, journalism, political science, philosophy and pure science.

The university buildings are grouped round the central library (530,000 volumes) and embrace St. Paul's Chapel, Hamilton Hall (Columbia College), Fayerweather Hall (Physics and Astronomy), Havemeyer Hall (Chemistry), Schermerhorn Hall (Natural Sciences)

Kent Hall (Law), School of Engineering, School of Mines, School of Journalism, Hall of Philosophy, Avery Hall (library nd school of architecture), University Hall (gymnasium), and Earl Hall religious life). The student body in 922 numbered 15,000, and its faculty ,203, headed by Nicholas Murray Butler, who was inaugurated president n 1902.

COLUMBIAN UNIVERSITY. See George Washington University.

COLUMBIAN EXPOSITION. See Expositions.

COLUMBINE (*Aquilegia*), perennial erbaceous plant (order Ranunculace) with divided leaves and long-stalked white, red, or blue drooping flowers with ve spurred petals.

COLUMBINE, Harlequin's dau. in arly Ital. comedy.

COLUMBITE ((FeMn)(NbTa($_2$O$_6$), mineral occurring in black lustrous rystals in N. America, Greenland, the Urals, and Bavaria, and of interest on ccount of the element of Columbium niobium) having been discovered in 801 as one of its constituents.

COLUMBUS, a city of Indiana, in Bartholomew Co., of which it is the ounty seat. It is on the Pittsburg, Cincinnati, Chicago and St. Louis, and he Cleveland, Cincinnati, Chicago and t. Louis railroads, and on the White River. It is an important manufacturng city and its industries include the making of leather, sawmill machinery, asoline engines, etc. Pop. 1920, 8,990.

COLUMBUS, a city of Georgia, in Muskogee Co., of which it is the county eat. It is on the east bank of the Chattahoochee River and is on the oundary line between Georgia and labama. It is on the Central of Georgia, the Southern, and the Seaboard Air Line, 100 miles southwest of Macon. Steamship lines connect it ith various points in Florida. It is one f the most important industrial cities f the South and is especially notable r the manufacture of cotton. In ddition there are manufactures of otton seed oil, barrels, agricultural machinery, fertilizers, etc. The city has several important buildings including a public library, conservatory of music, c. The buildings especially notable re a courthouse, Georgia Home Insurnce buildings, Bank of Columbia, and many churches. Four large and handome bridges span the river. The city as laid out in 1828 and was incorporated in the following year. On April 6, 1865, it was captured by the Federal rmy. Pop. 1920, 31,125.

COLUMBUS, a city of Mississippi, in Lowndes Co., of which it is the county seat. It is on the Mobile and Ohio and the Southern railroads, and on the Tom Bigbee River, 150 miles southeast of Memphis, Tenn. It is the center of an important farming region. Here are the State Agricultural Institute and College, and Franklin Academy. There are banks, a handsome courthouse, and newspapers. Pop. 1920, 10,501.

COLUMBUS, a city of Nebraska, in Platte Co., of which it is the county seat. It is on the Union Pacific and the Chicago, Burlington and Quincy railroads, and on the Loup River. It has important industries, including the manufacture of foundry products and shoes. Among the public buildings are a hospital and a public library. Pop. 1920, 5,140.

COLUMBUS, a city of Ohio, of which it is the capital. It is also the seat of Franklin Co. It is situated on both sides of the Scioto River, about 70 miles from its mouth, and is 100 miles northeast of Cincinnati. Columbus is the third city of the state in population and industrial importance. It has an area of 162½ square miles.

Columbus is well laid out and has an excellent street and sewer system. It has many notable public buildings, including the U. S. Government Building, which contains a post office, and Federal court. It contains also the State Capitol, Ohio State University, Central Ohio Insane Asylum, Odd Fellows Hall, Franklin County courthouse, soldiers' memorial, Y. M. C. A. building, public library and over 80 churches. The city contains also numerous educational and charitable institutions including the Columbus Normal School, a Catholic University, and many public and private high and secondary schools. Columbus has a large trade in grain, wool, cattle and iron, and its large industries include the manufacture of railway carriages, machinery, tools, shoes, leather goods, tiles and bricks. There are in all over 800 manufacturing establishments with an annual output valued at about $100,000,000. There are 8 national banks.

Columbus was founded in 1812 and in 1816 became the seat of the State government. It was incorporated as a city in 1834 when its population was less than 4,000. Pop. 1920, 237,031.

COLUMBUS, CHRISTOPHER, CHRISTOFORO COLOMBO OR CHRISTOBAL COLON (*c.* 1446 or 1451-1506), discoverer of America; *b.* Genoa; *s.* of a wool-comber; C. was in trade, and in 1474 went to Chios, and in 1476 to England. He gradually formed the idea of discovering a western passage to Asia; like others of his time, he did not know the girth of the earth, and believed Asia stretched farther eastwards than it does. After gaining the support of Queen Isabella of Castile, he set sail on his first voyage on Aug. 3, 1492, with three ships. On Oct. they first came to land at the Bahama Islands, and spent three months in the West Indies. C. then returned and was welcomed by Ferdinand and Isabella. On a second voyage in 1493 he discovered more islands, and founded the city of Isabella in Hispaniola. Returning to Cadiz in 1496, C. again set sail, 1498, discovering Trinidad, and the estuary of the Orinoco. C., however, had failed dismally in governing his new Span. colonies, and for a while fell from court favor. But on his return in 1500 he was welcomed again. He set out on his fourth and last voyage in 1502, sailing, among other places, to Cuba and Jamaica. He returned in 1504, and *d.* two years later.

C. was a tall and good-looking man. He accomplished much, but his subsequent voyages added comparatively small discoveries to his first achievement. He never realized that he had discovered a new continent.

C.'s elder bro., Bartolomeo (*d.* 1514), was deputy gov. of Hispaniola and a geographer; the second bro., Diego or Giacomo (*d.* 1515), was a Castilian statesman. Christopher's *s.*, Diego (c. 1480-1526), accompanied him on his second voyage, and became gov. of the Indies; his *s.*, Luis (1520-72), was for a time Duke of Veragua. Fernando (1488-1539), illegitimate s. of Christopher, accompanied him on his fourth voyage, and is supposed to have written the *Vida del Almirante.*

COLUMELLA, LUCIUS JUNIUS MODERATUS, writer on agriculture; *b.* Gades, Spain; flourished in Rome in I. cent. A. D.

COLUMN, ARMY, march-formation of troops; c. of fours in which men are four abreast; battalion in c. has companies two deep, separated by distance equal to front of company; quarter c. signifies interval of six paces.

Fighting in c., a favorite device of Napoleon, is now in disfavor owing to range and speed of loading of modern artillery.

COLVILLE, JOHN (*c.* 1540-1605), Scot. Presbyterian theologian, then (probably) R.C.

COLVIN, SIR SIDNEY (1845), Eng. literary and art critic; was Slade prof. of fine art at Cambridge, 1873-85; keeper of prints and drawings at the Brit. Museum, 1884-1912; has had considerable influence because of his fine taste and wide knowledge of art and letters among his numerous works are *Walte Savage Landor,* 1881; *Keats,* 1887 *John Keats, his Life and Poetry,* etc. 1917; as well as editions of the *Letter of Keats,* 1887; of R. L. Stevenson' *Works,* Edinburgh ed., 1894-7; and o the *Vailima Letters,* 1898, of Stevenson addressed to him.

COLVOCORESSES, GEORGE PARTRIDGE (1847), *b.* in Norwich Vt. Served in the Civil War two years as Captains' Clerk on board the ships Saratoga and Supply. Received appointment to the U.S. Naval Academy and graduated in 1869. (Hon. M.A Norwich University, Vt., 1898.) Was in the Navy for 45 years and in addition to serving in nearly all parts of the world was an instructor at the U.S. Naval Academy, 1886-90 and 1893-6. He distinguished himself at the Battle o Manila Bay for which he was advanced five numbers in grade. Was made a captain in 1905 and commanded the ships Lancaster, Newark and Yankee Retired at his own request in 1907 as Rear Admiral.

COLWYN BAY (53° 17′ N., 3° 43 W.), watering-place, on Irish Sea Denbighshire, N. Wales.

COMA, long loss of consciousness in which the beating of the heart and the breathing, which is usually slow and difficult, are the only signs of life; the person cannot move, cannot be made to feel or hear anything, and the limbs fall back helplessly when lifted. The most usual causes are: injury to the head, apoplexy, heartstroke, various brain affections, diabetes, anæmia poisoning by opium or alcohol. C. is distinguished from syncope by being much more severe and prolonged.

COMANA (*c.* 40° 20′ N., 36° 56′ E.) city, Pontus, Asia Minor; celebrated temple, dedicated to the moon goddess

COMANA, CHRYSE OR AUREA *i.e.* the golden (*c.* 38° 40′ N., 36° 34′ E.) ancient city, Cappadocia, Asia Minor celebrated temple, dedicated to Ma Nature goddess; chief priests took rank next after the king.

COMANCHES, N. Amer. Indian tribe now living in Oklahoma; formerly very warlike.

COMAYAGUA (14° 27′ N., 87° 39 W.), town, Honduras, Central America on Ulua R.; has cathedral and coll. declined since 1827; was capital up to 1880. Pop. 6,000.

COMB (*A.S. camb,* Ger. *kamm*) (1 A toothed implement of great antiquity used for the purpose of separating hair, to keep it clean and prevent it becoming matted; a curved form is used by women to secure the hair after dressing it. (2) in birds, the fleshy crest on head, usually on males only, and especially marked in domestic fowl and other of genus *Gallus*.

COMBE, ANDREW (1797-1847), Scot. physician and physiologist; younger bro. of George Combe, the phrenologist, whom he supported in his theories; author of several works on physiology.

COMBE, GEORGE (1788-1858), Scot. phrenologist and educationist; wrote *The Constitution of Man*, 1828.

COMBUSTION, or burning, a chemical process associated with light and heat, or the union of different substances with oxygen. Animal life may thus be considered a c. of protoplasm.

COMEDY (Gk. *komos*, a village festival, *aeidein*, to sing), refined humor as distinct from the broadness of farce and burlesque, and generally applied to plays of a light character which end happily; often a humorous criticism of the foibles of society, and consequently didactic; formerly applied to a tale, or narrative, cf. Dante's *Divina Commedia*.

COMENIUS, JOHN AMOS, KOMENSKI (1592-1671), educationist; *s.* of Moravian parents; ed. Herborn and Heidelberg; bp. of Moravians, 1632; wrote *Didactica Magna*, *Orbis Sensualium Pictus*, a child's picture book; an evangelical realist.

COMET, a heavenly body of a luminous and nebulous appearance which approaches to and recedes from the sun. The name is derived from the Greek, a name bestowed on these bodies because they generally possess a 'tail' or 'tails;' this tail in ancient times also being called a 'beard' when the train preceded the nucleus, as is the case when the C. is receding from the sun. Most C's. are divided into three parts, the *nucleus* and the *coma*, which together form the head of the C., and the *tail*. It is impossible to exactly define the limits of each of these parts, as they shade gradually into the other; quite often, too, a C. is without a tail, others again (as *e.g.* that of Cheseaux, (1744) may have half a dozen. The nucleus is the brightest portion, the coma which surrounds it is a hazy area of light, while the tail becomes more and more faint and attenuated until it fades out. How attenuated is the matter that composes a C. may be judged by the fact that stars have repeatedly been seen through the thickest parts, and that the earth has passed through the tail of a C. without any observable effect. Thus Sir J. Herschel records that in 1832 he saw a group of stars of the sixteenth magnitude through almost the center of Biela's C. The composition of a C. as revealed by the spectroscope (which was first successfully applied to determine the constitution of C's. by Sir William Huggins in 1868) is of gaseous hydrocarbons of extreme tenuity, while metallic lines, such as those of sodium and iron, have been observed in the spectrum of the nucleus. The spectrum of a C. also shows that the light is partly reflected sunlight and partly original. About 800 C's. have been recorded, the larger portion of them being telescopic only. More than half this number have had their orbits calculated, and are found to move in one or other of three out of the four conic sections, *i.e.* an ellipse, a parabola, or a hyperbola. The number of C's. moving on elliptical orbits is comparatively few, being about eighty. These 'short-period' C's. may be expected to return to the sun and therefore necessarily belong to the solar system (*q.v.*). Chief among these are Biela's, Encke's, and Halley's C's. The rest of the C's. move in parabolic paths, except about half a dozen, which, as the result of perturbations, have a hyperbolic movement. Regarded merely spectacularly and historically, C's. have ever been the object of man's curiosity and sometimes his fear. Thus the dream of Julius Cæsar and the battle of Hastings were believed to have been heralded by C's., a representation of the latter C. appearing in the Bayeux tapestry. The Bayeux C. has been shown by calculation to have indubitably been Halley's C., and it is conjectured that Halley's C. was the one recorded by the Chinese annals as having appeared in 240 and 87 B. C. The periodic return of certain C's. has been useful in fixing or confirming historical dates, that of Halley being the first to return as predicted, viz., in 1759. The most spectacular of the C's. of the 19th century was that found by Donati on June 2, 1858. It stretched over a space of 40°, or nearly a quarter of the sky, and its maximum width was about 10°. In 1921 there were four C's., the Reid, Dubiago, Encke and Pons Winnecke. The last named returned much behind its scheduled time and departed widely from its calculated orbit. Prior to its rediscovery by Barnard, on April 10, there seemed to be a chance of a close approach of this C. to the earth. However, even the expected meteor shower failed to materialize. See BIELA'S

Comet. In 1923 the following C's., by calculation, should return to the northern skies: May, Jiacobini; June, Coggia; December, Denning and Swift. In 1924: Barnard, June; Swift, May; Encke, October.

COMFORT, WILL LEVINGTON (1878), *b.* in Kalamazoo, Mich. High school education. Served in the Spanish-American War with the 5th Cavalry, 1898. Was war correspondent in China and the Philippine Islands in 1899 for the Detroit Journal Newspaper Syndicate and was also war correspondent for the Pittsburgh Dispatch Newspaper Syndicate in Japan and Russia in 1904. In addition to many short stories for various magazines, he wrote: *Rutledge Rides Alone*, 1910; *Fate Knocks at the Door*, 1912; *Down Among Men*, 1913; *Midstream*, 1914; *Red Fleece* and *Lot and Co.*, 1915; *Child and Country*, 1916; *The Hive* and *The Shielding Wing*, in 1918; *Son of Power*, 1920; and *This Man's World*, in 1921.

COMFORT, WILLIAM WESTAR (1874). Graduated from Haverford College, Pa., 1894; A.B., Harvard, 1895; A.M., 1896; Ph.D., 1902. (Litt.D., University of Pennsylvania, 1917; LLD., University of Maryland, 1918.) Instructor and associate professor of the Romance languages at Haverford from 1901-9, and professor of Romance languages and literatures and head of department at Cornell from 1909-17. Was made president of Haverford College in 1917. Author of *French Prose Composition*, 1908. Editor of Calderon's La Vida es sueno, 1904; Les Maitress de la critique litterataire au dix-neuvieme Siecle, 1909. Contributed numerous articles in philological and other journals.

COMILLA, KUMILLA (23° 28′ N., 91° 7′ E.), chief town, on Gumti, Tippera district, Bengal, India. Pop. 20,000.

COMINES, COMMINES (50° 46′ N., 2° 59′ E.), town, Flanders, on borders of France and Belgium, divided by river Lys; spinning of flax, wool, and cotton. Pop. 8,000.

COMINES, PHILIPPE DE, COMMINES (*c.* 1445-1511), Fr. hist. writer; *b.* Flanders; at the court of Duke of Burgundy, and of Louis XI. and Charles VIII. of France; author of *Memoirs*, 1464-83 and 1494-95.

COMISO (36° 57′ N., 14° 36′ E.), town, Syracuse, Sicily; site of ancient fountain of Diana; pottery and cotton manufacture. Pop. 22,000.

COMITIA, name applied to the popular assemblies of ancient Rome (as distinct from a *concilium*, any kind of meeting, and *contio*, an assembly for an announcement), summoned for official or legislative purpose. The earliest was the *comitia curiata*, in which the people assembled according to 'curiæ,' or parishes; later, it was only formal, and called together for the ratification by the people of certain official acts; the *comitia centuriata*, assembled on a military basis, elected the magistrates and declared war; the *comitia tributa*, assembled by territorial tribes, performed much of the work of government; the *concilium plebis* contained plebians only.

COMITY OF NATIONS, recognition of the laws of one country by another for purposes of convenience and necessity, (*e.g.*) an English firm in France must conform to Fr. laws.

COMMA. See Punctuation.

COMMANDER, officer in Amer. navy between rank of lieut. comm. and captain. C.-in-Chief, supreme acting officer of Brit. army until 1904, when office was abolished. C. of the Faithful, title of Caliphs; first assumed by Omar I., 634-44.

COMMANDERY, a division of land in the property of the Knights of St. John.

COMMEMORATION, ENCÆNIA, annual celebration at Oxford, marking completion of degrees, presentation of honorary distinctions, recitation of prize essays, etc.; usually held on third Wednesday after Trinity Sunday.

COMMENSALISM, zoological term indicating the dwelling together of organisms of different species; good example is anemone, which affixes itself to the acquired shell of the hermit-crab, and defends it by stinging-threads in return for the current-producing powers of hermit-crab, which enable it to obtain its food; c. occurs also in bivalves; frequently develops into parasitism.

COMMENSURABLE (Lat. *commensurabilis*). Two magnitudes are called 'commensurable' when they are of the same kind and each contain a third magnitude exactly, examples being a foot and a yard, or the numbers 14 and 21. If no unit or common measure can be found, the magnitudes are 'incommensurable,' examples being the diameter and the circumference of a circle, and in arithmetic numbers which are prime to one another, as 17 and 23.

COMMERCE, from very early times there has been traffic between nations, and at any rate some communication between distant countries can be traced almost in prehistoric times. The records and remains of ancient Assyria show a highly developed commercial intercourse with neighboring lands. Nevertheless, as compared with modern times, ancient c. was always scanty and uncertain. Thus there were trade routes between Europe and India, but the traffic cannot have been great. The Phœnicians were the great naval and commercial people of early times, in contrast to the Romans, who hated the sea. Later the commerce of the Mediterranean all fell under the sway of Rom, and the 'pax Romana' made trade at long distance possible. With the break-up of the Empire and the decay of the old civilization, everything was disorganized, and when mediæval commerce developed it was on different lines. The position of Venice at the head of the Adriatic, and the enterprise of her inhabitants, made her a commercial center between Western Europe and the Levant. In the North, the Hansa towns and the Netherlands were the chief carriers of the mediæval world.

The discovery of America opened up wide possibilities, and at first the wealth of the New World went to Spain and Portugal. Spain, however, declined, for her prosperity was not really on a firm basis, and the bulk of commercial activity now fell to other peoples. Britain took the lead in opening up N. America, and also in the trade with India. For general information relating to modern commerce, see under the different countries. For the commerce of the United States, see UNITED STATES, section COMMERCE.

COMMERCIAL AVIATION. See AERONAUTICS.

COMMERCIAL TREATIES. In classical times treaties of trade and commerce were made. Agreements were made frequently in the Middle Ages about commercial transactions. Commercial treaties more like those now made appear from the XII cent., for then several European cities, the most important, perhaps, Venice and Genoa, rise into prominence. England made a treaty with Norway in 1217, and then others with various countries. Naturally, a treaty was generally simply an arrangement between two states, and sometimes it took the form of granting to another nation privileges already enjoyed by one—the 'most favored nation' principle. Of modern developments the most important is that of the intimate connection of commercial treaties with tariffs, whereby the tariff is a means of bargaining between two countries. Following the World War there was a general reconstruction of commercial treaties, resulting from world-wide changes in the industrial system of the world.

COMMINATION, ancient service of Anglican Church, said on Ash Wednesday; announces God's judgment against sinners.

COMMISSARIAT, army department responsible for the supply of provisions, forage, clothes, etc.

COMMISSION PLAN, a form of municipal administration which places the conduct of a city's affairs in the hands of a single manager or group of commissioners. It is either a modification of or displaces the mayor-and-council system, according to the size of the cities that adopt it. Originally, as first established in Galveston, Texas, in 1901, the commission form of municipal government was devised as a provisional measure to tide the city over the financial troubles that befell it following the destruction of property caused by a tidal inundation the year previous. All the powers vested in the mayor, council and various boards were transferred to five citizens. These commissioners, by changes in the charter, became elected by popular vote, and one was named mayor-president. A majority of them enacted municipal ordinances, voted appropriations, awarded contracts and made all appointments to civic positions. Four of them also acted as respective heads of a city department, such as finance, water, police, and public works.

The plan, created as an administrative emergency measure, succeeded. It became permanent and other Texan cities adopted it. Elsewhere in the country the plan was questioned as giving too much power to a small group of men. Des Moines, Iowa, in adopting it in 1907, lessened the force of this objection by providing that the elected commissioners should be non-partisan, should be subject to recall by referendum any time after three months' tenure of office, and that all street franchises they granted must be endorsed by popular vote to be valid. Where a city manager is appointed, he is a paid, professional official who undertakes the actual administrative work and is responsible for the operation of the various departments, while the commissioners perform legislative functions and shape policies.

Since Des Moines adopted the commission plan, its popularity has grown far and wide among cities that sought to end or curb the political abuses inherent in the traditional system of executive government by a mayor and boards and by a double-chambered council exercising legislative functions. It avoids friction, delays and evasions of responsibility, reduces elective offices, secures citizens of a better type as commissioners, and improves the administrative system by efficiency methods. On the other hand, the danger remains of excessive power being placed in the hands of the commissioners, with possibilities of collusion and corruption without detection. Nevertheless, the commission form, while not perfect, is becoming more and more accepted as an unquestioned improvement over the old system, especially the standard form of city-manager plan recognized by the National Municipal League. This plan had been adopted by nearly 200 cities to the beginning of 1922. The most notable addition is Cleveland, with a population of 797,000, which will establish the city-manager plan in 1924. As adopted by larger cities, the plan provides for the election of a body of councilmen or commissioners, who appoint the city manager. Among cities so governed with populations exceeding 100,000 are Akron and Dayton, O., Grand Rapids, Mich., Nashville, Tenn., and Norfolk, Va. Among communities administered under the plain commission plan of government adopted by Des Moines are some of the largest cities in the country, notably Buffalo, New Orleans, Jersey City, Portland, St. Paul and Oakland.

COMMISSIONAIRE, member of a corps of pensioned soldiers who performs service as door-keeper, messenger, etc., in banks and business offices; corps founded by Sir Edward Walter, 1859.

COMMITMENT, the written instrument instructing the removal of a prisoner to a place of custody; 'committal' is the court's decision or sentence.

COMMITTEE denotes a person or body of persons to whom some matter or business is committed or entrusted. In general it consists of a few persons selected from a larger body to act on behalf of, or report to, the latter. Committees are elected by nearly all clubs and societies to act as executive on ordinary matters, and public bodies frequently delegate part of their powers to standing committees, appointed to look after particular branches of their affairs. The deliberations of a committee are supposed to be free from rules and formalities governing debate in a public assembly, and an entire body may resolve itself into committee when certain matters are under discussion. See under PARLIAMENT.

COMMITTEE OF PUBLIC SAFETY. See FRENCH REVOLUTION.

COMMODITIES, DISTRIBUTION OF. See COOPERATION.

COMMODORE, temporary rank given in the Brit. navy to captain in command of a squadron.

COMMODUS, LUCIUS ÆLIUS AURELIUS (161-92), Rom. emperor; *s.* of Marcus Aurelius; succ., 180; became a tyrant.

COMMON LAW, the body of Eng. customary law, as distinct from that embodied in Acts of Parliament. It is derived from the customary laws which prevailed in Saxon times, viz. the Dane Law, Mercian Law, Wessex Law. During the Norman period the king's court selected such of these customs as were generally applicable to the whole country, and rejected the rest. Some of this common law is as ancient as the Early Britons, and Blackstone has pointed out that 'however compounded, and from whatever fountains derived, it has subsisted immemorially in this kingdom.' Judges have always sought to apply new combinations of circumstances, as they arose, the rules of law which were found in these ancient legal principles and judicial precedents.

COMMON PRAYER, BOOK OF. See BOOK OF COMMON PRAYER.

COMMON SCHOOLS, otherwise public schools, are generally institutions providing free and compulsory tuition for the people at large, supported and controlled by them through their local or national governments. In the United States, public education is in the hands of the individual states. Free public schools are maintained by them, including elementary, secondary or high schools, and, in many cases, universities. Common schools, in fact, at first confined to elementary and secondary grades, are becoming known as embracing all degrees of learning from the kindergarten to the university. Primary schools, the basis of all higher education, were early established in most of the colonies and were usually conducted by women as a means of support. Massachusetts in 1643 inaugurated the system that required townships to provide schools for all its children, the tuition to be paid either by parents or by a levy. Free schools, however, did not become a national development till the nineteenth century was well advanced. As they became established, the system adopted embraced graded tuition, primary, grammar and high school; the appointment of State superintendents, who determine the qualifications of teachers by examination and supervise the instruction given; uniform text books; public examinations; the provision from public funds for libraries and apparatus; modern structures and furnishings; and access to the schools of all children of suitable ages. In 1922 there were 271,319 public school buildings in the United States. According to the census of 1920, of 15,306,793 children between 7 and 13 years old, 13,869,000, or 90.6 per cent. attended school; of 3,907,710 between 14 and 15, 3,124,129, or 79.9 per cent.; of 3,828,131 between 16 and 17, 1,644,061, or 42.9 per cent.; and of 5,522,082 children between 18 and 21, 814,651, or 14.8 per cent. attended school. In 1919-20 the average daily school attendance in 45 leading American cities was 2,940,540 pupils, and the total current expense of educating them $222,157,892, or an average cost per pupil of $75.55.

COMMONWEALTH, system of popular government; the term is applied to Eng. state between death of Charles I., 1649, and Restoration, 1660, during which parliament and the army were supreme. In U.S.A. any one of the United States is a c., *e.g.* the C. of Virginia. C. of Australia was formed on Jan. 1, 1901, by federation of separate colonies.

COMMUNE, small Fr. administrative division.

COMMUNE OF PARIS (1871), see FRANCE (*History*).

COMMUNE, mediæval term applied to municipal corporations which developed in Middle Ages; in many particulars exempt from common law, some of them became city-states. The various barbarian tribes which overran the Rom. Empire often left fortified towns standing, and in these mediæval c. sprang up; sometimes, however, an artificial town was organized, generally to be distinguished by its symmetrical planning—central market-place, relation of streets, etc.

In Germany, fortified Rom. towns were usually in X. cent. seats of bishoprics and ruled by bp's with civil and military as well as ecclesiastical jurisdiction over town and district. The chief liberty of the town was that its inhabitants could not be impleaded outside its bounds, and an important enactment for the country at large was that runaway serfs who dwelt in town for a year and a day became free. Corporations developed XI. to XIII. cent's, obtaining imperial charters of liberties; town council (*Rat*), composed of burghers and burgomasters, imposed fines for breach of peace and levied duties, while merchants became incorporated in guilds. Encroachment of towns on privileges of bp's and nobles led to wars and establishment of many imperial cities, under immediate control of emperor; these were nearly all disfranchised, 1815, having decayed.

In Italy, c. was also head of bishopric, but important difference was that it was also seat of nobles, inhabitants being classified as *capitani*, chief nobles, *valvassori*, landowners dependent on the *capitani*, and the industrial class (*popolo*, the people). Lombard merchants were important in VIII cent.; their cities obtained imperial charters, and in XII. cent. defeated emperor in war, using quarrels between papacy and empire to consolidate their power. C. was composed of popular assembly, council, and executive body of 12 *consules*. Establishment of *podesti* as head of the city led to tyrannies of Visconti of Milan, Scala of Verona, Carrara of Padua, etc. Florence saw many battles between her democracy and nobles and final establishment of rule of Medici; Venice became ruled by small oligarchy of nobles and merchants; Rom. municipal freedom was overthrown by popes and not reinstated until modern times.

Fr. municipalities in south resembled those of Italy in constitution, but generally remained *villes consulaires*; those of north resembled Ger. c. or Eng. borough, often having *mayeur*, *burgenses*, etc. Span. towns became of importance through acting as outposts against Moors.

COMMUNISM, a doctrine which assumes the paramount importance of the social body over the welfare or comfort of the individual. In its primitive form communist organization manifests itself among communities so poverty-stricken that mass action becomes necessary to sustain existence, as where the soil is so arid that its products must be distributed in rations, as food is rationed during war time. Where such conditions are permanent, social organization usually assumes the form of local communism, as in certain parts of the Slavic countries of Southern Europe, where the 'zadruga' is a permanent institution. Here the families of a district, usually related by ties of blood as well, live together in one household, sometimes numbering several hundred, the eldest male being the chief authority, and all sharing equally in the products of their labor. In ancient Judea and in adjoining countries communism also took on a religious significance, in that all the members of a religious cult lived together, laboring together and sharing the product of their labor in common. The first Christian converts were often so organized. It was in imitation of them that the numerous religious communist colonies were founded in the United States in the early part of last century, such as those in Oneida and Watervliet. Other attempts have been made on a purely economic basis, as by Robert Owen and his followers, in 1825, at New Harmony, Ind., and the numerous experiments fostered by Horace Greeley and his associates, but where the element of religious fanaticism has been absent, they have always failed. In a more modern sense, communism refers to a system of social organization favored by Karl Marx and his followers (see BOLSHEVISM). Under this system as proposed the community of property is less rigid, but the slogan of the followers of this idea was nevertheless, 'from each according to his ability, to each according to his need.' The absurdity of the idea became so apparent, even to the followers of Marx, that gradually even the name was abandoned and that of Socialism assumed by their organizations instead, which demands only the common ownership by the people of the chief means of production, public utilities, natural monopolies, etc. Whereas the older followers of communism proposed that each worker was to share equally in the general product of the labor of all, the later Socialist proposed only that the individual worker should have the full product of his individual toil. The Bolsheviki of Russia, on coming into power, again assumed the old Marxian name, and proposed at least a partial return to the old ideals, but all attempts approaching actual practice have failed and even in Russia the scheme remains as much an ideal as elsewhere.

COMMUTATION, act of exchange, particularly the exchange of one penalty for another.

COMNENUS, name of family which ruled Byzantine Empire from Mid-XI. cent. to beginning of XIII. cent., and Trebizons from beginning of XIII. cent. to mid-XV. cent.

COMO (45° 48′ N., 9° 3′ E.), city, capital of prov. Como, Lombardy, Italy, at S. W. extremity of Lake Como; ancient *Comum*; bp.'s see; chief edifices—cathedral, 1396-1732, and town-hall, both of marble; number of fine churches; interesting Rom. relics; destroyed by Milanese, 1127; rebuilt by Barbarossa, 1155; birthplace of two Plinys; district rich in orange groves and olives; manufactures silk, satin, gloves. Pop. 44,146.

COMO, LAKE OF (46° N., 9° 15′ E.), lake, Lombardy, Italy; ancient *Larius Lacus*; traversed by river Adda N. E. to S. W.; beautiful scenery; *c.* 30 miles long; tourist resort.

COMORIN, CAPE (8° 4′ N., 77° 35′ E.), in Travancore; southern extremity of India.

COMORO ISLANDS (11° 30′ S., 43° 30′ E.), group of volcanic origin belonging to France, in Mozambique channel, between E. coast of Africa and N.W. coast of Madagascar; area, *c.* 800 sq. miles; principal islands, Great Comoro, Anjuan, Mayotte, and Mohéli; mountainous; loftiest heights, 8,500 ft.; fertile soil; inhabitants, Arabs, Malagasy, negroes; religion, Mohammedan; coco-nut palm oil; discovered 1591, by Eng. navigator Lancaster; chief exports, cane sugar and vanilla. Pop. *c.* 96,000.

COMPANIES, LIABILITY. — A Joint-Stock Company is an association of seven or more persons who contribute an amount of capital, in the same or different proportions, for carrying on a particular business with a view to profit. Such a company is either limited or unlimited.

COMPARATIVE ANATOMY, the science which treats of the structure of animals (including man), and at the same time compares the structure of different animals with one another. The term is being gradually abandoned, since all biological science now adopts comparative methods.

COMPASS, RADIO. A radio receiving device for determining the direction in which maximum energy is received, or a radio transmitting device for determining the direction of maximum radiation. See RADIO TELEPHONY.

COMPASS, a magnetized needle balanced on a fine point above a card. The needle will set itself so as always to point in the same direction—to the magnetic N. and S. Owing to this property, it is of great value to the navigator. In a modern ship's c. the *needle* consists of eight light magnetized strips of steel, placed parallel to each other like the steps of a ladder, and fastened together by silk threads. Such a compound needle is more reliable, and is also steadier in a heavy sea than is a single needle. The *card* is frequently a thin aluminum rim, on which a paper scale divided into the 32 *points* of the c. is fixed. The c. (consisting of needle and card) is contained in a copper bowl, supported on gimbals (concentric rings), which keep it horizontal no matter how the ship pitches. The iron and steel of which the ship is built affect the c.; this is corrected by a process known as 'swinging the ship,' as a result of which masses of soft iron or magnets are distributed near the c. so as to counteract the ship's magnetic effects. In the

Liquid or *Spirit* c., the card floats on a mixture of water and alcohol. Card and needle turn together. Very great steadiness is obtained with this form of instrument.

In the latest form of c.—the *Gyro* c.—the gyrostatic principle is applied. By means of a gyro wheel the axis of the whole combination is kept parallel to the earth's axis, and the instrument thus shows both latitude and the ship's course. The c. is unaffected by the ship magnetism or by surrounding masses of iron, and may be used to control a number of suitably placed dials. The c. is supposed to have been used in China about 3,000 years ago, but it was not heard of in Europe until the XII. cent. About the beginning of the XIV. cent. Flavio Gioja, an Italian, invented a c. of eight points. Columbus discovered the magnetic declination (1492) of the c.

COMPARATIVE PSYCHOLOGY. See Animal Psychology.

COMPASS PLANT (*Silphium laciniatum*), N. Amer. prairie plant, the leaves of which point N. and S. so as to avoid the midday heat. The name is also applied to *Lactuca scariola*, the ancestor of the cultivated lettuce.

COMPENSATION is money paid as reparation for injuries received or other losses by reason of sickness, accident, etc.

COMPENSATION, WORKMAN'S. See Employer's Liability.

COMPIÉGNE (49° 25′ N., 2° 50′ E.), town, on Oise, France; formerly fortified; favorite residence of Fr. kings; chief building is Royal Palace, erected by Louis XV. and now used as a museum of antiquities; there are some interesting churches and a fine Gothic hôtel de ville; Joan of Arc made prisoner of the English at siege of C. (1430); canvas, rope-making, boat-building, and distilling are chief industries. Pop. 13,439.

COMPOSITÆ, the largest order of flowering plants. Their florets are packed into heads (*capitula*) surrounded by an involucre of bracts. In some (*e.g.* dandelion) the florets are alike, in others (*e.g.* daisy) the outer ray-florets are larger than the inner disk florets. The capitula are a remarkable adaptation for pollination by insects, a great number of florets being pollinated by a single insect. The sunflower, dahlia, chrysanthemum, Michaelmas daisy, cornflower, chicory, hawkweed, colt's-foot, thistle, and golden-rod are common examples.

COMPOUNDS AND MIXTURES, CHEMICAL. See Chemistry.

COMPRESSION (astron. and geog.), the ellipticity or polar flattening of the earth and other planets; (engineering) the compressing of remaining steam or gas in the cylinder of an engine after the exhaust to reduce the velocity of the piston on its return stroke.

COMPRESSED AIR is air which has been raised to a pressure considerably above that of the atmosphere. The compression is accomplished by machines ('compressors') consisting of one or more cylinders in which pistons are moved with a reciprocating motion, imparted, either by cranks on a rotating shaft driven by a prime mover, or by directly connected steam driven pistons. In multi-cylinder compressors the compression is done progressively and the cylinders are so proportioned that an equal amount of work is done on the air in each one.

When air is compressed, work is done on it, part of which appears as heat so that the air comes from the cylinder at a higher temperature than that at which it entered. In multi-cylinder, (called multi-stage) compressors the air in passing from one cylinder to another, is led through a chamber or intercooler, in which it is cooled (either by water coils or air) before being further compressed.

Air compressors are usually rated according to their capacity in cubic feet of air at atmospheric pressure.

Air, when compressed, acquires energy which is available to do useful work. This energy, imparted to the air by having its pressure raised, can be recovered when the pressure is reduced (*i.e.*, when the air expands) by passing it through some form of air motor. When air expands, its temperature is lowered to an extent depending upon the amount of expansion. This cooling is sometimes great enough to freeze any water vapor which the air may contain, thus clogging the air motor. To prevent this and to increase the amount of energy in the air, heaters are in some instances installed in the air pipe close to the motor. The theoretical gain in efficiency by preheating is 10.6%. Commercially, however, the gain is greater than this. Compressed air, as a medium for the transmission of power is not a commercial success, except in special cases where efficiency is not a factor. To illustrate this, in a theoretically perfect system, the loss in the compressor is 12.3%, in the transmission, 6.2% and in the air motor, 16.6%. giving a combined efficiency of 64.9% for the system as a whole. In powder works, arsenals, magazines and in the neighborhood of highly combustible matter, compressed air is employed to run small locomotives, hoists, elevators, etc. In mines in which explosive gases occur, it is used to operate drills, under-cutting machines, etc. In such cases the air after being used contributes no small part to the ventilation of the workings. For the operation of portable tools such as drills of various kinds, boring machines, automatic hammers, and even hair clippers for animals, compressed air is used to advantage. For this work a pressure of about 100 pounds per sq. inch is employed. It is used almost exclusively to operate the brakes on railroad trains, and pneumatic operation of signals and switches is widely employed.

COMPRESSED AIR BRAKE. See Brake.

COMPRESSED AIR LOCOMOTIVES. Compressed air is used for driving trams in mines and manufacturing plants. Locomotives operated with this motive power in such surroundings have the advantage of freedom from any form of combustion, making them suitable for service in the vicinity of explosives. The air is stored at a high pressure of 1,000 to 4,000 pounds per square inch in a steel reservoir carried on the locomotive, and admitted therefrom into the engine cylinder at a working pressure of 100 to 150 pounds. Compressed air is also used for motor cars. Its employment as a motive power is closely allied to that of steam, and is of marked utility in driving certain types of machinery, especially those that are portable and readily handled, such as rock drills, coal cutters, riveting hammers, sand tampers, saws, crane hoists, air-life pumps and other pneumatic appliances. Compressed air is adaptable to transmission, loses no power from radiation, and in underground work has a discharge that is a healthful instead of a noxious addition to the atmosphere.

COMPROMISE OF 1850, an attempt to adjust the differences in regard to slavery between the North and South, through the passage of measures formulated by Henry Clay. These measures provided for the admission of California as a free State; for the territorial organization of New Mexico and Utah on the principles of 'squatter sovereignty'; prohibition of slave trade in the District of Columbia, and a new and more effective fugitive slave law. This was the last compromise on slavery. Its passage was secured through the support of Daniel Webster, who urged that the North owed concessions to the weaker South. John C. Calhoun opposed the compromise as being insufficient. The measures were entirely ineffective in bringing about the result desired. Indeed, they led largely to the final break between the North and South.

COMPULSORY INSURANCE. See Insurance.

COMPURGATOR, the precursor of the modern juryman. Under the Anglo-Saxon law an accused person could produce twelve persons to declare on oath their belief in his innocence.

COMSTOCK, ANTHONY (1844-1915), an American public official, *b.* at Canaan, Conn. He served in the Civil War and afterwards was engaged in commercial business in New York City. In 1873 he was appointed special agent for the Society for the Suppression of Vice, and he held this position for the remainder of his life. He was especially diligent in prosecuting publishers of obscene books and the suppression of gambling and lotteries. Laws passed by Congress to bring about these objects were drafted by him. He was the author of several books on frauds and gambling.

COMSTOCK, GEORGE CARY (1885), astronomer, *b.* Madison, Wis. He was a graduate (1877) of the University of Wisconsin, studying astronomy there as part of his tuition under Prof. James C. Watson, whose assistant he became at the university observatory in 1879. From 1885 to 1887 he served as professor of mathematics and astronomy at the Ohio State University, thereafter becoming associate director of the Wisconsin university observatory, then director, as well as professor of astronomy. His published works include a text book on astronomy, another on field astronomy for engineers, and several volumes of astronomical observations.

COMSTOCK LODE, a famous silver mine in Nevada, discovered in 1859; the richness of the mine may be said to have caused the rise of Nevada as one of the great gold and silver mining districts of the world. It was financed chiefly from San Francisco, and the 'bonanza' boom of the seventies led to a financial panic. The Comstock district is exceedingly rich both in gold and silver, but the fall in the price of the latter resulted in great depression. Virginia City, a prosperous mining center, is built on the site of Comstock Lode.

COMTE, AUGUSTE, ISIDORE AUGUSTE MARIE FRANÇOIS XAVIER (1798-1857), Fr. philosopher; *b.* Montpelier, where he worked in the École Polytechnique, but quarreled with his master; went to Paris, 1816, where he lived on very slender means;

came into friendly relations with Saint-Simon in 1818. Pub. first vol. of *Positive Philosophy* in 1830, the sixth and last coming out in 1842; pub. his *Positive Polity and Positivist Calendar*, the latter in imitation of the Catholic Calendar of Saints. In his lectures C. promulgated his new 'Religion of Humanity.' The *Catechism of Positivism* came out in 1852.

C.'s work, despite his diverse elements, can be regarded as a unity. He had written a *Plan of the Scientific Works necessary to reorganize Society* in 1822. He formulated the *Law of the Three States*, according to which knowledge was (1) theological (belief in supernatural government of the world), (2) metaphysical (objects are ruled by external but abstract force), (3) positive (law explains everything).

COMUS (classical myth.), divinity (son of Bacchus and Circe); supposed to preside over festive proceedings; the title of a masque written by Milton.

COMYN, JOHN (*d.* 1306), Scot. baron, known as *Red Comyn*; murdered by Robert Bruce in Dumfries Church.

CONANT, THOMAS JEFFERSON (1802-91), Amer. Baptist theologian; author of works on Old Testament; prof. in several theological coll's.

CONATION, according to some, same as feeling; to others, a mental state caused externally, or one leading to action.

CONATY, THOMAS JAMES (1847-1915), Roman Catholic prelate, *b.* Ireland. As a child of three he came to the United States with his parents, who settled in Taunton, Mass., where he received primary education in the district schools. He became a student of the College of Saint Sulpice, Montreal, and of Holy Cross College, Worcester, Mass. He was ordained priest in 1872, officiating at churches in Worcester. He early took a strong interest in temperance and in 1887 became president of the Catholic Abstinence Union of America. Georgetown and Laval (Que.) Universities conferred upon him their D.D. degrees. In 1896 be became rector of the Catholic University, the next year a domestic prelate, in 1901 titular bishop of Samoa, and two years later bishop of Monterey and Los Angeles. His New Testament Studies are used in many Catholic schools.

CONCA, SEBASTIANO (1679-1764), Florentine artist.

CONCARNEAU (47° 53′ N., 3° 53′ W.), seaport, on Bay of La Fôret, France, sardine fisheries. Pop. 7,631.

CONCEPCIÓN (*c.* 37° S., 72° 15′ W.), important province, S. Chile, between Argentine and Pacific; has splendid commercial position; is an agricultural and cattle-raising district; produces wheat, flour, and wool; its wines are famous; has also valuable coal mines; principal port, Talcahuano. Area, 3,311 sq. miles. Pop. 1920, 245,054.

CONCEPCIÓN (36° 49′ S., 72° 3′ W.), city, S. Chile; bp.'s see; has noteworthy cathedral; is center of rich agricultural region; flour-mills, furniture factories, distilling and brewing. Pop. 62,000.

CONCEPCIÓN, VILLA CONCEPCIÓN (23° 33′ S., 57° 30′ W.), town and river-port of Paraguay, on Paraguay R., S. America; tea is chief export. Pop. 15,000.

CONCEPT, an idea without particular details; more generally, any idea.

CONCEPTION, IMMACULATE. See IMMACULATE CONCEPTION.

CONCEPTUALISM, scholastic philosophical term denoting position intermediate between Nominalism and Realism.

CONCERTINA, small wind instrument with two rectangular keyboards and bellows; invented by Sir Charles Wheatstone, 1829.

CONCERTO, musical term for a composition designed to display the skill of the performer and the capabilities of his instrument; is accompanied by full orchestra; consists of three movements of different character, its form being derived from the Sonata.

CONCH, term for the shells of marine molluscs, particularly the large spiral shell of the genus *Strombus*, often used as a horn or for ornamental purposes; name is applied to natives of the Florida Keys and Bahamas, who feed on shellfish.

CONCHOLOGY, The branch of zoology which treats of molluscs with reference to their shells. From very early times the beauty of various shells have made them objects of study, and some time ago the science of C. was immensely popular. It has, however, been of less repute recently, as it is recognized that the inhabitant of any shell is much more important than the shell itself to science. Considered in its proper light, however, the science of C. may still be interesting to scientists, when the conditions and constitutions of the molluscs themselves have been more keenly investigated.

CONCINI, CONCINO, MARSHAL D'ANCRE (*d.* 1617), Florentine adventurer; gained wealth and dignity under Louis XIII. of France; eventually assassinated.

CONCLAVE (Lat. *conclave*, apartments locked with one key).—(1) Term applied in original sense until middle of XVIII cent. (2) Assembly held for solemn or secret purpose, this meaning arising from (3). (3) Technical term for sitting of coll. of cardinals in Rom. Church to elect Pope. Bp. of Rome was elected by people in earliest times; this led to bloodshed, erections of antipopes, and invocation of state interference; gradually Emperor became chief influence at papal appointments and insisted on power to ratify elections; Pope Clement II. was confirmed right of election by lay prince, 1046. In latter half of XI cent., however, Hildebrand's reforms resuscitated papacy, and in 1059 a papal bull enacted that cardinals with advice of clergy should elect pontiff and people should ratify their choice; Lateran Council, 1179, gave election to cardinals alone, enacting that Pope could not be app. without consent of two-thirds of college; to prevent prolonged vacancies cardinals were shut up until decision was made; Council of Lyons, 1274, established system (which later became law) of allowing cardinals in c. no private apartment, no communication with outside world; moreover, their food-supply was cut down gradually, so that starvation might force them to make a decision.

CONCORD, a city of Massachusetts, in Middlesex co. It is on the Concord River, and the Boston and Maine Railroad, 20 miles west of Boston. It is a city of great historical interest and is beautifully situated in the midst of a beautiful rural district. For many years it was the seat of the famous Concord School of Philosophy, in which some of the most eminent writers of the 19th century, including Emerson and Alcott met, deliberated, and gave instruction to others. Here also lived at various times Hawthorne, Thoreau, Louisa M. Alcott and other American writers. It was the scene of earliest military movements during the Revolution. The Americans had concealed here a large stock of arms and military stores which General Gage, the military commander in Boston, had determined to capture and destroy. On their way to accomplish this the British forces were met at Lexington by the Colonials and thus began the first battle of the Revolution. The stores at Concord were destroyed by the British, were driven off and the effort ended in the famous flight to Boston. Concord has a handsome public library, a high school, and many beautiful homes. It is a favorite suburban residence of Boston. Pop. 1920, 6,461.

CONCORD, a city of New Hampshire, the capital of the State, and the county seat of Merrimac co. It is on the Merrimac River and the Boston and Maine Railroad, 75 miles northwest of Boston. The abundant water power makes it an important industrial community and the manufactures include the making of carriages, shoes, electrical apparatus, silverware, leather goods, etc. Nearby are extensive quarries of excellent white granite. The city is well laid out and has many notable buildings, including the State Capitol, city hall, courthouse, State Pension, State Insane Asylum, and U.S. Government buildings. There is an excellent public school system and several well known private schools, including St. Paul's School for Boys. Concord was settled in 1725 on the site of an Indian village, under the name of Rumford. The name was changed to its present title in 1755. It became a city in 1853. Many historic occurrences took place here. It is noted as the scene of many battles between Indians and whites. Pop. 1920, 22,167.

CONCORD, a city of North Carolina, in Cabarius co., of which it is the county seat. It is on the Southern Railroad. There are important industries including the manufacture of cotton, foundry products and machine shop products. Here is located Jackson Training School and Scotia Seminary. Pop. 1920, 9,903.

CONCORD, BOOK OF, name given to five Lutheran Confessions, the last, issued 1580, being *Formula Concordioe.*

CONCORDANCE, term used of compilations (generally of the Bible) which give all words or phrases arranged alphabetically with a list of passages where they occur. The first one was compiled in XII. cent. A. D., a Hebrew one by a Rabbi appeared in XV. cent. The most famous English C. is Cruden's, first pub. 1737 and frequently revised.

CONCORDAT, the term applied to agreements between the ecclesiastical and secular powers, specially between the R. C. Church and the State in different countries in mediæval and modern times. When Church and State were practically coterminous, as they were in the Middle Ages, and the Church claimed not only sacred and spiritual but other authority besides, (*e.g.*) jurisdiction over all offenses committed by clerics, clash between the religious and secular arm was inevitable. This reached a height in the famous Investiture Controversy between the popes and emperors, terminated by the *Concordat of Worms*, 1122. Another famous concordat was that between Pope Pius VII. and Napoleon in 1801. This was repudiated by the Fr. Republic in 1905. Agreements have been made between the Roman See and various European countries. The right of the State to nominate to important benefices is sometimes recognized, or at any rate the right of objection.

CONCORDIA (classical myth.), Rom. divinity, representing peace and friendship.

CONCORDIA (45° 44′ N., 12° 52′ E.), small ancient town, Venetia, Italy; important under the Romans; cathedral; the see was transferred to Portogruaro, 1339.

CONCRETE, a solidified mixture of sand, gravel, and stone fragments with cement or lime used in engineering and architecture. The pebbles, sand, etc., called the *aggregate*, are thoroughly mixed with the *matrix* (the best being Portland cement) and a certain amount of water. The result is a plastic mass which can be moulded into any shape and size, such as slabs for paving, blocks for breakwaters weighing hundreds of tons, foundations of buildings, floors, walls, tanks, conduits, etc. It sets very hard, and is one of the most durable materials known; it is, therefore, much used for sea-walls. Its lack of tensile strength essential for beams, arches, columns, piles, etc., is overcome by introducing into the mould steel bars or a network of bars according to the purpose for which it is required, and when set the steel **c.**, (*i.e.*) armored or *reinforced* **c.**, beats masonry for stability, fireproof qualities, and economy. In the case of thin walls, however, the boarding necessary for moulding and the better quality aggregate necessary makes the construction more expensive than brickwork. The invention of reinforced concrete has revolutionized civil engineering and architecture. See CEMENT.

CONCRETE, philosophical term meaning something which can be seen or felt, as opposed to abstract, which is only supposed. Thus 'blind man' is concrete; 'blindness' is abstract.

CONCRETE BRIDGE WORK. See BRIDGES.

CONCRETIONS (geol.), rounded or irregular masses formed in sandstones, impure limestones, shales, and other sedimentary rocks, by the aggregation of calcium carbonate, calcium phosphate, silica, round fragments of shells, bone, or other material; (med.) pathological solid secretions in the human body, *e.g.* gall-stones and bladder-stones.

CONCUBINAGE. The cohabitation of a man with a concubine is a very ancient custom. Among the Greeks married men were allowed to have concubines; the position of the latter was not utterly despised, and their children had some status, if recognized by their father. The Roman law, too, recognized concubines; their position was in many cases respectable, but Augustus, to encourage regular marriages, passed the Lex Julia and the Lex Papia Poppæa, which enacted that only women of low rank should be chosen as concubines. The children of concubines were not legitimate, but were called 'natural,' and their right of inheritance was very limited, though they were rendered legitimate if their parents afterwards married. In the O.T. times C. was permitted as a relief from a barren marriage, and was extensively practiced.

CONDÉ, LOUIS DE BOURBON, PRINCE OF (1530-69), Fr. Huguenot Leader; murdered at *Jarnac* after having surrendered.

CONDÉ, LOUIS II, DE BOURBON, PRINCE OF (1621-86), Fr. general known as *the great Conde*. As Duc d'Enghien, at age of 22, C. won decisive battle of Rocroy against Spain, an important step towards ascendancy of France, 1643, and great victories against Empire, 1644-46; succ. as prince, 1646, and his great territories and abilities made him a dangerous noble; supported regency against Fronde, 1649, but was arrested, 1650; new Fronde obtained his release, and he led armies against government forces, 1651-58. C. was pardoned by Louis XIV., and distinguished himself in his wars.

CONDÉ, PRINCES OF, Fr. house of Bourbon assumed this title XVI to XIX. cent's, from their estate of Condé-sur-l'Escaut.

CONDENSATION. See LIQUEFACTION OF GASES.

CONDENSED MILK. See MILK, CONDENSED.

CONDENSER, apparatus for cooling a vapor so as to change it to a liquid (*e.g.*) the exhaust steam of a steam-engine; apparatus for compressing gases; instrument for concentrating an electric charge (see LEYDEN JAR); a lens or system of lenses to concentrate light, especially in microscope or in optical lantern; appliance used in manufacturing woolens.

CONDILLAC, ETIENNE BONNOT DE (1715-80), Fr. philosopher; took orders, but devoted all his time to study of philosophy; follower of Locke and friend of Rousseau; wrote *Essai sur l'Origine des Connaissances Humaines*; *Traite des Sensations* is his greatest work. He contends that everything is due to sensation, and nothing to heredity. Though himself religious, his thought, while clear, is hard and unspiritual; his work influenced subsequent Eng. philosophers, but was severely criticized by the eclectic philosophers of the first half of the 19th cent. Time has shown that his ideas agree with the psycho-physiological discoveries of modern times.

CONDOR (*Sarcorhamphus gryphus*), large bird of prey inhabiting the Andes of S. America. It can fly at great altitudes (over 20,000 ft.), and sail in the air without flapping the wings, which may measure 10 ft. between the tips. The head and neck are devoid of feathers. C's are exceedingly voracious, and gorge themselves with carrion—sheep, calves, etc.—till they are dazed, when they can be easily caught.

CONDORCET, MARIE JEAN ANTOINE NICOLAS CARITAT, MARQUIS DE (1743-94), famous Fr. *doctrinaire* and distinguished mathematician; assisted with Fr. *Encyclopedie*; became member of Academy of France, 1782; wrote (1785) on laws of chance, *Vie de Turgot*, 1786; *Vie de Voltaire* (whose disciple he in many ways was), 1787; and while concealed in Paris during Terror gave complete expression to political views in *Progres de l'esprit humain*. Chosen member of Legislative Assembly, 1790; drew up memorandum for suspension of king and calling of National Convention; opposed execution of king and many other acts of Convention, and was proscribed.

CONDOTTIERE (Ital.), military commander who hired out the services of himself and band. Mercenary forces played important part in warfare from XIII. to XVI. cent., especially in wars of Ital. communes by whom name was bestowed.

CONDUCTION, ELECTRIC, when the terminals of a galvanic cell are connected together by a metallic wire, an electric current passes through the wire, and the wire is said to *conduct* electricity. The case is analogous to the flow of water in a pipe which connects two cisterns at different levels. The amount of water flowing per second will be greater in proportion to the difference of levels, and will be less in proportion to the resistance to flow, which is offered by the pipe. Similarly, in the case of an electric current, the difference of electromotive forces at the ends of the wire, and the resistance of the wire, are the all-important factors. The relationship is expressed by *Ohm's Law*, which states that the amount of current is proportional to the electromotive force acting, and inversely proportional to the resistance, and is symbolically expressed by the equation $C = \frac{E}{R}$, where C is the current in amperes, E the electromotive force in volts, and R the resistance. The unit of resistance is known as the *ohm*, and is defined as the resistance of a uniform column of pure mercury, 1063 centimetres long, and weighing 144521 grams, the measurements being taken at 0°C. The *specific resistance* of a substance at any given temperature is the resistance, expressed in ohms, between two opposite faces of a centimetre cube of the substance at the given temperature. The reciprocal of the specific resistance is known as the electric *conductivity* or *conductance*.

The resistance of metals depends on a number of conditions. Firstly, on the chemical purity of the specimen: in general, small admixtures of other metals increase the resistance. Secondly, on the temperature: resistance of a pure metal increases nearly proportionately to the absolute temperature, although there is evidence to show that it vanishes before the zero of absolute temperature is reached. Thirdly, on the physical state of the substance: annealing of a metal generally alters its specific resistance. Fourthly, the resistance generally changes when the material is subjected to stresses such as compression or torsion. Fifthly, it also changes in certain cases when the substance is exposed to magnetizing forces. Alloys have, as a rule, a greater resistance than any of their constituents, and with increase of temperature their increase in resistance is much smaller than in pure metals. The passage of a current through any conductor is accompanied by the development of heat. *Joule's Law* states that the rate at which heat is developed is jointly proportional to the square of the current strength and the resistance; *i.e.* if a current of strength C flows through a conductor of resistance R, the heat developed is C_2R per unit time.

With regard to conduction in liquids, the chief fact is that when it takes place chemical changes are always produced. For example, if a current be made to pass through a solution of sodium chloride (common salt), chlorine gas appears at the point where the current (according to the usual convention) enters the solution, while the sodium, liberated at the point where the current leaves the solution, is acted on by the water present so as to form hydrogen, which is thus set free at that point. This process is known as Electrolysis (*q.v.*), and the species of conduction involved is known as *electrolytic conduction* in order to distinguish it from *metallic conduction* referred to above.

Both forms of conduction may be satisfactorily explained by the electronic theory which has been brought forward prominently in recent years. According to it, a conductor of pure metal contains atoms which carry a charge of positive electricity and also contains a large number of negatively charged particles, termed *electrons*, which are free to move among the atoms. The motions of the electrons may be regarded in the same way as that of the molecules in a gas are regarded by the kinetic theory of gases. Taken on the average, they will have a certain mean velocity, will collide with each other and with the positively charged atoms, and between two successive collisions each will have traversed a certain mean free path in a certain time. In the ordinary condition of the conductor, when no current is passing through it, the velocities of the electrons will be distributed equally in all directions in space; but if the conductor be included in a galvanic circuit; the electromotive force thus applied induces them to travel, on the whole, in the direction of that force. The positively charged atoms are, however, not free to move except through small distances from their mean positions, and hence the electrons move relatively to the atoms. It is this motion of the electrons which constitutes a current of electricity. The theory shows that the conductivity is proportional to the number of electrons in unit volume of the substance and to the length of their mean free path. Apart from the influence—supposed to be small—of the second of these two factors, it follows that good or bad conductors of electricity differ by having more or fewer electrons, respectively, per unit volume. As a rule, substances which conduct electricity well also conduct heat well, and this is quite in agreement with the electronic theory, according to which the ratio of the two conductivities, thermal and electric, should be the same for all pure metals. Experiment shows that this is the case, at least for all the better conducting metals. For an explanation of the mechanism of conduction in liquids, see ELECTROLYSIS.

In ordinary circumstances gases do not conduct electricity. But a gas may easily be rendered conducting in a variety of ways. If it is exposed to the action of Röntgen rays, cathode rays, rays from uranium or radium, ultraviolet light, electric spark discharge, contact with incandescent metals, or if it is mixed with the products of combustion from flames, it can conduct electricity for some time after the action which produced conductivity has ceased, but this conducting power always diminishes and finally disappears. When in the conducting state the gas is said to be *ionised*. Conduction in such cases presents certain peculiarities. In the first place it does not follow Ohm's Law unless the electromotive force is very small. Second, the conducting power may be removed by various methods, such as filtration of the gas through glass-wool, bubbling it through water, passing it through a metallic tube, or passing a current of electricity through it. These and other facts show that conduction in an ionised gas is due to the presence of particles, that these particles are electrified, and that their electrifications are both positive and negative.

The principles of electric conduction in metals find their widest application in the distribution of electric energy for the purposes of lighting, heating and power.

CONDUCTION OF HEAT is the propagation of heat from one body to another, with which it is in contact, or from molecule to molecule in a homogeneous substance. Heat is considered to increase the vibration of the molecules of a substance, but no visible motion of the matter takes place. The increased vibration of the warmer molecules must be by impact handed on to the neighboring colder molecules, so that heat flows from the part of higher temperature to that of lower temperature. Gases, liquids, and solids conduct heat.

Liquids possess poor conductivity, and this is important for animal and plant life in lakes. Water is cooled from the top. The surface water cools to 4°, and sinks till the whole of the water is at 4°. As it cools still further, it grows lighter and floats, finally freezing, but owing to the poor conductivity the water at the bottom is rarely colder than 4°. It is difficult to estimate the conductivity of liquids, because the process is interfered with by connection. As a rule, good conductors of electricity are good conductors of heat. The conduction in gases is almost negligible.

CONDUCTOR LIGHTNING, SEE LIGHTNING.

CONE (geom.) solid bounded by a circular or other closed curving base and a surface obtained by connecting every point on the circumference of the base with a point outside, called the vertex. A *right circular* c. is obtained by rotating a right triangle round one of the sides enclosing the right angle.

CONE, HUTCHINSON INGHAM (1871), an American naval officer, *b.* at Brooklyn, N. Y., son of Daniel Newman and Annette Ingham Cone. After graduating from the Florida Agricultural College he entered the U.S. Naval Academy and graduated in 1894. During the Spanish-American War he served on the U.S.S. Baltimore and participated in the Battle of Manila Bay. He afterwards served on various duties and stations, including head of the Bureau of Steam Engineering with the rank of rear-admiral and was also marine supt. of the Panama Canal. He saw foreign service during the World War and was wounded on board the S.S. Lienster, sunk in the Irish Sea by a German submarine in 1918.

CONEY ISLAND, a small island, about 10 miles southeast of New York City. It is in the borough of Brooklyn. It is about 5 miles in length and from half to three-fourths miles in width. It is separated from the mainland by Coney Island Creek. Coney Island is one of the most famous resorts in the world, and has numerous attractions, which are visited by hundreds of thousands of people daily during the summer season. It has an excellent bathing beach, and is connected with New York by steam and electric railways and steamboat lines. Coney Island was one of the first landing places of the Dutch and was for over 200 years considered worthless. With the building of steam railways in 1875, the place became popular. Several public parks are owned by the city.

CONFALONIERI, FEDERICO, COUNT (1785-1846), Ital. patriot; opposed Austria's annexation of Lombardy; implicated in revolt of Piedmont against Austria, 1821; imprisoned till 1836; exiled till 1840.

CONFARREATIO, most ceremonious form of marriage amongst patrician ancient Romans.

CONFEDERACY, UNITED DAUGHTERS OF THE, a southern society organized in Nashville, Tenn.. in 1894, to unite Southern women, preserve Confederate records and gather historical material. The members are either widows, wives, mothers, sisters or female descendants of officers of the Confederate army or navy, or similar kindred of civilians who served the Confederacy. The Society has chapters all over the United States, including the North, and a membership of about 27,000.

CONFEDERATE STATES OF AMERICA, title assumed by Southern States of America—Alabama, Arkansas, N. Carolina and S. Carolina, Florida, Georgia, Louisiana, Mississippi, Texas, Tennessee, Virginia (excluding W. Virginia)— when seceding from U.S., 1860-1. The secession was not regarded in South as revolution, but exercise of right of individual states to withdraw from compact of Union, the great doctrine of Southern party being 'state rights.' Chief reasons of secession were: (1) legislation of Congress against slavery, which Southern States could not afford to abandon; (2) superiority of North in population, and, as a result, (3) superiority in house of representatives and consequent Northern control of politics and commerce of South. On election of President Lincoln, the Northern nominee, 1860, S. Carolina declared for secession. U.S. refused to acknowledge Confederate States, 1861, and after four years of war recovered seceded States for the Union. The constitution of Confederate States, though allowing large amount of state rights, was, like that of U.S., government by central Congress (held at Richmond, in Virginia) composed of president, executive council and house of representatives. Anti-slavery legislation was forbidden. See UNITED STATES (*History*).

CONFEDERATION, term signifying alliance of independent communities, *e.g.* North German Confederation; C. of Rhine, 1805, was alliance of Bavaria, Württemberg, and other states with France; later, 1806, sixteen states joined Napoleon in a c., which lasted till 1813.

CONFERENCE ON THE LIMITATION OF ARMAMENTS, also called *Washington Conference,* a conference called by President Harding in 1922 as a result of a resolution passed in Congress in June of that year calling for an international conference on the limitation of armaments. President Harding having ascertained the attitude of the Great Powers and finding them agreeable issued invitations on August 11, 1921, for these Powers to send delegates or representatives to attend such a conference. Originally the subject to be discussed was limited to naval armaments, but the program of the conference was broadened to include matters relating to the Far East, as these were considered conditions which most threatened misunderstanding. The program or agenda of the conference as submitted by the United States included limitation of naval armaments; rules for the control of new agencies; limitation of land armament; questions relating to China, including territorial integrity, administrative integrity, and the open door concessions; development of railways; railroad rates, the status of existing commitments, and questions relating to Siberia and China. Another item related to mandated islands. Although some objection was first raised by Japan to consideration of question relating to her interests in the Far East, that country later agreed to the agenda. The countries represented by delegates were the United States, Great Britain, including Canada, Australia, New Zealand and India, China, France, Italy, Japan, the Netherlands and Portugal. The British delegation was headed by A. J. Balfour; the French by Aristide Briand, Premier; Italian by Senator Carlo Schanzer; the Japanese by Baron Kato; the Netherlands by H. A. Van Kernbeeck; the Portuguese by Viscount d'Alte, minister to the United States, and the Chinese by the minister, Mr. Alfred Sze. The American delegates were Charles E. Hughes, Secretary of State; Senator Henry Cabot Lodge; Elihu Root, former Secretary of State, and Senator Oscar W. Underwood. The first session was held in Washington, on November 12. The conference was opened by a speech of welcome by President Harding in which he outlined its purposes. On the second day of the session Secretary Hughes electrified the conference, and indeed, the world, by recommending drastic reductions in naval construction, and the destruction of a larger part of the navies then in being. He promised the consent of the United States to this program. The delegates to the other countries in the days following agreed to practically all the suggestions by Secretary Hughes. The conference did not consider the limitation of land armament, finding too strong an objection on the part of France to such a proposal. There was objection, too, on the part of France to any considerable limitation in the number of submarines and small craft. With these objections, the program of the conference went through, although with considerable discussion, practically as contained in the agenda. The treaties prepared and signed at the conference were as follows: Treaty on the limitation of naval armaments; treaty limiting submarines and noxious gases; the four power Pacific treaty; treaties on Chinese policies and customs tariff signed by nine powers. The treaty on the limitation of naval armaments provided for navies of the following strength: United States, not exceeding 525,000 tons; British Empire, 525,000 tons; France, 175,000 tons; Italy, 175,000 tons; Japan, 315,000 tons. This treaty contained provisions for the replacing and scrapping of ships. The treaty on limiting submarines and noxious gases provided for regulations for submarine warfare and prohibited the use in war of asphyxiating, poisonous or other gases.

The four-power Pacific treaty, signed by Great Britain, the United States, France, Italy and Japan provided that the respective powers agreed, as between themselves, to respect their rights in relation to their insular possessions and insular dominions in the region of the Pacific Ocean. In consideration of the passage of this treaty, the Anglo-Japanese treaty was rescinded. The treaty on Chinese policies and customs provided for the continuation of the open door, and modified the tariff regulations heretofore in force. The contracting powers agreed not to support any agreement by their respective nationals with each other designed to create spheres of influence in China. In addition to these treaties two others were made; one between the United States and Japan referring to rights in the island of Guam, providing that this should not be fortified; and another between Japan and China which provided among other things for the return of Shantung to China. The treaties were presented to the United States Senate by President Harding, on February 6, 1923, and were speedily ratified with practically no opposition. The treaties were also ratified by Great Britain, Italy, Japan and France in 1923.

CONFESSION. It is held to be necessary for the remission of grievous sin. C. is of various kinds, but it is commonly defined as the avowal of one's own sins made to a duly authorized priest for the purpose of obtaining their forgiveness through the power of the keys. The 4th Lateran Council, 1215, laid down a precept that once a year should be the minimum of confession. The necessity of c. is denied by Prot. Churches, but its use, under certain circumstances (*i.e.*, for relief of mind when sick), is encouraged by the Church of England.

CONFESSION OF AUGSBURG. See AUGSBURG, CONFESSION OF.

CONFESSIONAL, like confession, may mean the tomb of a martyr; or more generally, the place for the hearing of auricular confession in the R.C. Church; generally a slight wooden structure. The priest, seated, hears the penitent's confession through a small grating.

CONFESSOR, one who hears a confession, in R.C. Church necessarily a priest; or one who testifies to his faith.

CONFIRMATION, the rite in the Christian Church which follows baptism, a giving of the Holy Ghost; in Western Christendom performed by the laying on of hands (and in the R.C. Church anointing with chrism) by the bp. In the Eastern Churches the bp. only consecrates the oil with which the parish priest anoints candidates.

CONFISCATION (Lat. *fiscus*, the treasury), in its literal signification, means forfeiture of property to the treasury, as (*e.g.*) in Roman law the *Lex Julia* punished violence without arms by C. of a third of the offender's property. In English law C. of property, generally known as forfeiture, followed on conviction for felony.

CONFUCIUS—Romanized form of K'ung Tsze—(*c.* 550-478 B.C.), Chin. philosopher and reformer; *b.* in state of Lu, part of modern province of Shantung; descended from famous prehistoric Chang monarch Hwang-ti, and *s.* of Shuh-liang Heih, a distinguished officer, over 70 years of age at birth of C. C. passed youth of poverty, became teacher at twenty-two; child pupils were gradually replaced by band of disciples, whom he gave voluntary instruction; made chief magistrate of city of Chung-tu about 498; wonderful virtue and power exercised universal influence, but he fell before the machinations of external foes, and was forced to withdraw from Chung-tu, and abandon attempt to carry out political theories. His attempts to persuade princes to become model rulers also failed, and, although he wandered throughout China and won great fame, he remained in private life until his death.

No philosophical writings by C. are known of, but his disciples and descendants collected his sayings, the most important of their works being *Ta-hio* (The Great Subject), *Tchoung-young* (The Invariable Mean), and *un-yii* (Philosophical Discourses). These form three of the four classics learned by heart in the state schools of China. C. taught veneration of past and imitation of antique virtues, superiority to ambition (saying that the fool complained of not being known by men, the wise man of not knowing men), charity, forgiveness, repentance, example in preference to preaching. He founded Chin. philosophy although his teaching was practical, not abstract, and his disciples complained that he left them no word on the nature or end of man. He annotated and arranged the chronicles and lit. of China, and his *Spring and Autumn*, a brief abridgment of Chin. history is regarded as a Chin. classic. He lies buried in K'ung cemetery, adjoining city of K'iuh-fow, where his descendants (said to number 50,000) live. This spot is Mecca of China.

CONGER, EDWARD HURD (1843-1907), diplomatist, *b.* Knox county, Ill. He entered the Union army immediately after graduating at Lombard University in 1862. Following the war he studied law, graduating at the Albany Law School in 1866, and opened a practice at Galesburg. He settled in Des Moines, Iowa, in 1868. From 1885 to 1891 he served in Congress as a Republican Representative. Thereafter he was identified with diplomacy, acting as minister to Brazil, China and Mexico between 1891 and 1905. While at Peking as American Minister in 1900 he and his family were besieged by the Boxers in the British legation in common with the entire diplomatic corps. In 1902 he headed an American commission that negotiated a commercial treaty with China.

CONGER EEL, THE, a muscular voracious fish of the eel family (*Muroenidoe*). In color it is usually whitish below and a dark blue-grey above, whilst its length varies from three to even ten feet. It has no pelvic fins nor scales, but its dorsal fin is continuous and stretches very far forward. These eels have wide mouths, sharp closely-packed teeth and free tongues, and though their flesh is coarse are quite edible. They occur in four distinct species which are widely distributed over the temperate and tropical seas.

CONGESTION, superfluity of blood in an organ due to pathological reasons; may be venous (passive), (*e.g.*) c. caused by ligaturing arm and preventing veins from returning blood to the heart, or arterial, active caused by dilatation of arteries, as in blushing; may also occur in cases of debility to back and posterior portion of lungs, when it is called *hypostatic* c.

Treatment usually takes the form of gentle friction and pressure to induce freer circulation, or removal of cause of obstruction and internal administration of drugs.

CONGLETON (53° 10′ N., 2° 14′ W.), market town, Cheshire, England; principal manufacture, silk; several coal mines and iron foundries in district. Pop. 12,000.

CONGLOMERATE, name for rocks consisting of rounded shingle or pebbles of hard material (granite, gneiss, limestone, etc.), embedded in a fine-grained matrix (sand). They are a typical shore formation and are imperfectly stratified, their age being sometimes determined by fossils found in the pebbles. Rocks composed of angular fragments cemented together are known as breccias.

CONGO, BELGIAN, or **CONGO BELGE,** Belgian colony, comprising practically basin of riv. Congo, Africa (4° S., 21° E.), bounded N. by Fr. Equatorial Africa, Sudan; E. by Brit. and the former Ger. E. Africa; S. by Rhodesia, Angola; W. by Atlantic, Fr. Equatorial Africa. Surface generally is depression, which not improbably was formerly occupied by inland sea; great part covered by trackless primeval forests, and surrounded by highlands and hills. Chief river is Congo, with affluents Kasai-Sankurru, Chuapa, Lolongo, Boloko, and others; chief lakes are Leopold II., Tumba in W.; Tanganyika, Mweru, on E. boundary; chief settlements are Boma (cap.), Banana, Leopoldville, Vivi, Matadi. Climate is tropical. Congo is controlled by colonial ministry of Belgium; administered by gov.-gen., who represents king, and is assisted by vice-governors-general; it is divided for administrative purposes into twenty-two districts, each under commissioner.

There are many tropical fruits; rubber and palm oil produced in large quantities; coffee, tobacco, maize, rice, corn, and cacao are grown, and cattle are bred. Other products are ivory, palm kernels, gums, copal, beeswax, sorghum, camwood. Principal exports are rubber, gold, ivory, palm oil, cocoa, copal, coffee. Among imports are arms, machinery, wines, spirits, provisions, clothing, etc. Rich copper mines are now bring extensively worked in Katanga district. Gold, iron, and tin are produced. Communications include railway from Matadi to Stanley Pool, another in Mayumbe, and one from Rhodesian frontier to Elizabethville (the copper district); while others are being made. Mileage, over 1,000. The Congo and its tributaries are navigable to an extent of 5,500 m.

The Congo Free State was founded by Leopold II., King of the Belgians, as a neutral independent state. The work of exploration of district had been carried out chiefly by Stanley, who was financed by Leopold II. Various treaties were concluded with natives whereby Belgium acquired considerable amount of territory, and the districts thus acquired were combined as state, which was recognized by other powers in 1884-5, when, as the result of the Berlin Conference Leopold II. of Belgium was appointed king, promising to keep country open to trade of all nations and to put down slavery. Leopold's first action was the war against the Arabs, who carried on trade in slaves and ivory; having expelled them, he obtained permission from other powers to levy taxes on pretext of carrying out various improvements; the taxes he levied were so heavy that traders of other nations were all ruined and gave up business. Leopold then proceeded to organize the state as a great rubber-producing private estate; rubber had to be produced by natives, as no other race could stand the intense heat of the forests; and Leopold's system was one of payment by results, consequences being that agents had great incitement to enrich themselves at expense of natives, who in some cases were treated with horrible cruelty. By 1904 public opinion on the subject had become so strong that a commission was appointed to inquire into the matter. Since then atrocities have ceased, at least in more accessible districts. The state was annexed to Belgium (1908). During the Great War it was undisturbed by hostilities.

By the Anglo-Belgian Agreement of 1919, the districts of Ruanda and Urundi, portions of the former territory of German East Africa, which adjoin the Belgian Congo on the east, was assigned by Great Britain to Belgium. They have an area of about 15,000 square miles and an estimated population of 3,000,000.

The total area of the Belgian Congo if 909,654 square miles, with a native population between 5 and 7 millions. The European population in 1921 was about 7,000.

CONGREGATION, assembly of worshippers in any church; term used variously of some religious orders (not taking solemn vows) or assemblies.

CONGREGATIONAL METHODIST CHURCH, THE, was founded in 1852 by a group of ministers of the Methodist Episcopal Church, South, who objected to certain features of the episcopacy and itineracy of the latter institution. Their object was to establish the new denomination on a broader form of democratic organization. At first the doctrine of Methodism was adhered to strictly, but later this was modified by a certain degree of connectionalism. Within a few years the new denomination had found adherents in the neighboring states of Alabama, Florida and Mississippi, where congregations were founded. In recent years congregations, may be found in practically all of the Southern states. In 1887 there was a secession of almost a third of the membership to the Congregational Church, a further loss being entailed in 1906 through the same cause, amounting to almost a quarter of the remaining membership. In 1919 there were 298 congregations of this denomination in the country, with 220 ministers and nearly 11,000 church members. There were 182 Sunday schools with 1,146 teachers and officers, and about 9,000 pupils. Official organ is The Messenger, published from Ellisville, Miss.

CONGREGATIONALISTS, a religious denomination whose underlying principles are based more on freedom of church government than on doctrinal belief. The Congregationalists, in other words, espouse and practice local autonomy in the conduct of their churches, each of which is absolutely independent. Their independence, however, is tempered by the duty each recognizes of sustaining co-operative relations of fellowship one with another. The church may thus be designated as a voluntary association of locally independent congregations, with no official creed. Doctrinally the Congregationalists originated from English puritanism and Presbyterian Calvinism, but, like other bodies, have outgrown strict adherence to some theological tenets that marked their beginnings. The modern creed identifies itself with Evangelicism, which relies on the four gospels, or evangelical books of the Bible and their fundamental doctrines. They regard the Bible as the only and sufficient rule of faith and practice. In recent years the tendency has been to place less emphasis upon certain doctrines, such as the fall of man, the governmental theory of the atonement, the equal and infallible inspiration of the Scriptures, and eternal punishment, and to stress certain others, such as the divine fatherhood, human brotherhood, and the immanence of the divine spirit. Another tendency is to shorten and simplify their tenets. Most churches adopt creeds and covenants which are similar and often identical, but they are their own, voluntarily entered into, not imposed on them by any ruling authority. Some churches even discard creed and are content with a covenant. In its form of worship the sect recognizes the right of such congregation to conduct its services as it chooses. Liturgical or responsive forms of readings are present but generally Congregationalist worship remains essentially non-liturgical. The sermon has always been and remains the central feature of the services.

Congregationalism came to America from England via Holland with the Mayflower in 1620. The Pilgrims, who founded Plymouth colony, were duly augmented by other English puritans driven from their native land, and a church on the Congregationalist model was formed at Salem in 1629. A strong and numerous Congregationalist population grew in New England. By 1650 that section had 51 churches of the creed, and there were few meeting places of other sects till the end of the century. Congregationalism, thus early and firmly established, has been an influential factor in determining church policy in the United States. In the 19th century the church established home missionary work, which enabled it to form colonies as the country grew, and also organized colleges and schools. Educationally the church has achieved the distinction of founding Harvard, Yale, Amherst, Bowdoin, Dartmouth, Middlebury, Williams, Oberlin, Illinois, Beloit, Carleton, Washburn, Colorado, Berea, Fisk, Atlanta, and other universities and colleges, or more than forty in all, as well as Mount Holyoke, Smith and Wellesley among women's colleges, and many high-class preparatory schools, including the two famous Phillips Academies. None of these institutions, however, are sectarian.

In 1921 the Congregationalists had 5,924 churches in the United States with a total membership of 819,225. New England is still the creed's stronghold, a third of the membership being in that section. There were 5,665 ministers, 2,220 of whom were without charges. Salaries paid to ministers in 1920 amounted to $6,490,691, or an average of $1600 her pastor. The property of the denomination was valued at $112,020,676.

CONGRESS, literally, an assemblage, term used especially in diplomacy. Its chief non-diplomatic use is for the U.S. Congress, a legislative assembly corresponding to Parliament. In diplomacy the term is applied to an assembly of the representatives of sovereign states, particularly the Great Powers, such as the C's of Vienna, 1814-15, and Berlin, 1878; their work really comes under the sphere of International Law.

CONGRESS OF BERLIN. See BERLIN, CONGRESS OF.

CONGRESS OF THE UNITED STATES, the legislative branch of the Federal Government, composed of two chambers, the Senate and the House of Representatives. The Constitution (*q.v.*), created Congress and defined its functions and powers. The Senate has a membership of 96, or two members representing each of the 48 states, the legislative powers of each state in national affairs being thus equalized irrespective of their population and area. Formerly Senators were elected by the State legislatures. See ELECTORAL REFORM. Since 1913 they have been chosen by popular vote, but this change in the method of selecting them does not make them representatives of the voters. They still represent the States.

The Senate is a continuing body, that is, its membership never expires *en masse* as the House of Representatives or the British House of Commons does Each member is elected for six years, but only one-third of the membership ends at one time, or every two years. Thus two-thirds of the Senate membership continues in office while the other third becomes subject to the changes of the popular vote in seeking re-election. Candidates for the Senate, like those for the House, must be residents of the States they would represent. They must be thirty years of age. The Vice-President of the United States is the presiding officer of the Senate, but as he does not represent any state, he is not a member. He is a chairman who takes no part in the Senate's deliberations and can only vote when the Senate is tied.

The House of Representatives numbers 435 and is newly elected every two years. See APPORTIONMENT. Members must be at least twenty-five years old. The House electes its Speaker, or presiding officer, from its own members.

All revenue bills originate in the House. The House also has the sole power of impeachment, while the Senate can function as an impeachment tribunal. Bills that pass both chambers are subject to the President's veto, but this can be and is overridden by a resubmission of the vetoed measure to another vote in each house, and if a two-thirds majority is secured a vetoed bill becomes a law. The Senate acts largely as a restraining influence upon hastily considered legislation passed by the House. It also exercises a restraint upon the President's powers in making appointments to important government posts, each appointment being subject to its approval. Its assent is likewise needed for the operation of any treaties the executive branch may make with other countries.

Each house conducts its affairs under its own rules. The real work of legislation is done by committees, of which the House in 1923 had 45 and the Senate 35. The outstanding committees of both houses are those which consider legislation relating to appropriations, banking and currency, foreign affairs, interstate and foreign commerce, agriculture and finance. Joint conference committees are formed by members of both chambers to adjust differences in measures which one or the other has amended in passing them. Congress meets at least once a year on the first Monday in December. The session may be long or short, but in either event the President has power, if occasion require, to compel Congress to meet again by calling a special session. Members of the Senate and House receive a salary of $7,500 a year. The Vice-President and the Speaker are paid $12,000 a year.

CONGRESSIONAL APPORTIONMENT. See APPORTIONMENT.

CONGRESSIONAL LIBRARY. See LIBRARY OF CONGRESS.

CONGREVE, WILLIAM (1670-1729), Eng. dramatist; *b.* Bardsey, Yorkshire; plays include: *Old Bachelor and The Double Dealer*, 1693; *Love for Love*, 1695; *The Mourning Bride*, 1697; *The Way of the World*, 1700; defended morality of stage against Jeremy Collier (*q.v.*); wrote some masques and artificial lyrics.

CONGREVE, SIR WILLIAM, Bart. (1772-1828), Eng. inventor; invented the war rocket, 1805; formerly much used, a hydro-pneumatic canal lock, and many other mechanical contrivances.

CANIBOS, MANOAS, Amer. Indian tribe in Peru.

CONIC SECTION, curve in which a plane intersects a cone. All the possible resulting curves obtained thus, are: *pair of intersecting straight lines, circle, ellipse, parabola*, and *hyperbola*. Geometrically, the last three curves are defined as: the locus of a point moving so that the ratio of its distance from a fixed point, called the *focus*, to its distance from a fixed straight line, called the *directrix*, is constant. This ratio, called the *eccentricity*, is less than, equal to, and greater than, unity, for the ellipse, parabola, and hyperbola respectively. The circle is a particular case of the ellipse. Analytically, a conic section is represented by an equation of the second degree of the form $ax^2+bxy+cy^2+dx+ey+f=0$.

CONIFERS. See GYMNOSPERMS.

CONINE, CONIINE ($C_8H_{17}N$), alkaloid obtainable from the hemlock plant; oily liquid with characteristic and penetrating taste and smell; B.P. 166° C.; a powerful poison.

CONINGTON, JOHN (1825-69), Eng. scholar; trans. Vergil's *Aeneid*.

CONISTERIUM, room in which ancient wrestlers were sanded after being anointed.

CONJEEVERAM, KANCHIVARAM (12° 50′ N., 79° 45′ E.), town, Chingleput district, Madras, Brit. India; one of most sacred cities of Hindus; several large temples, numerous pagodas; captured by Clive, 1752. Pop. 46,164.

CONJUGAL RIGHTS, RESTITUTION OF.—Where one party to a marriage has withdrawn from cohabitation without lawful cause, the other may petition for 'the restitution of conjugal rights.' If the Court grants a decree, and the respondent disobeys it, the petitioner can then obtain a decree of judicial separation on the ground of desertion.

CONJUNCTION (astron.), the apparent nearest approach of two heavenly bodies having the same longitude or right ascension. It is termed *inferior* when two planets are between the sun and the earth, and *superior* when on the side of the sun most distant from the earth.

CONJUNCTIVITIS. See EYE.

CONJUNCTIONS, in grammar, are words used as connectives between one word and another, or one sentence and another. They are distinguished from prepositions by being purely joining words without any governing power. They are divided into classes according to their meaning, as 'affirmative,' 'temporal,' 'hypothetical,' and 'adversative.'

CONJURING is the art of performing tricks which mystify the observer, but are merely due to sleight of hand or skillfully devised apparatus. Many of these, such as fire-eating, swallowing molten metal, and similar tricks, were performed in very early times, but, whereas the old magicians laid claim to supernatural powers, the modern performer does not scruple to admit that all his mysteries are entirely the result of trick. Amongst the most successful performers of the past may be named Comus (late XVIII. cent.). Jules de Rovère, Préjean, Olivier, and Robert Houdin. Of late years the conjurer has been greatly assisted by the increased knowledge of science, and has availed himself of the use of electricity, magnetism, and optics.

CONKLING, ROSCOE (1829-1888), statesman and lawyer, *b.* Albany, N. Y. In his earlier career he was closely identified with Utica, N. Y., where he studied and practiced law, and of which city he became mayor (1858-9). He duly acquired a national fame both at the bar and in politics. He served in Congress between 1859 and 1867 and was a member of the U.S. Senate from 1867 to 1881. In Washington he was notable for his powers as a debater and for his eloquence. He was a strong supporter of President Grant's reconstruction policy and a foremost leader in every political movement of his time, allying himself with the more radical elements of his party on various occasions, a course that threw him in conflict with his fellow Republican leader, James G. Blaine. In his later years he was leader of the 'Stalwart' faction of the Republican party in New York. In this role he clashed with President Garfield over federal patronage in 1881, and both he and Thomas C. Platt, the other New York Senator, resigned their seats. The New York legislature refused to reelect them, and Conkling retired to private life. In 1882 he refused an associate justiceship of the United States Supreme Court.

CONNAUGHT (53° 44′ N., 9° W.), province, W. Ireland, comprising counties of Mayo, Galway, Leitrim, Roscommon and Sligo; mountainous in west; principal river, Shannon; fine scenery; formerly one of Irish kingdoms, ruled by O'Connors; divided into counties about 1580. Area, 6,845 sq. miles. Pop. 609,966.

CONNAUGHT, DUKE OF, ARTHUR WILLIAM PATRICK ALBERT (1850), *s.* of Queen Victoria; has held various military appointments; app. Gov.-Gen. of Canada, 1911.

CONNEAUT, a city of Ohio, in Ashtabula co. It is on Conneaut Creek and on the Lake Shore and Michigan Southern, the Bessemer and Lake Erie, and other railroads. It has an excellent harbor and shipping facilities and is one of the most important ports for the shipping of iron ore and coal. Its industries include railroad shops and manufactures of bricks, shovels, rubber, canned goods, etc. Its public institutions include a public library, a high school and a public park. Pop. 1920, 9,343.

CONNECTICUT, state, U.S. (41°-42° 3′ N., 71° 55′-73° 50′ W.), one of New England states of Union; bounded N. by Massachusetts, E. by Rhode Island, S. by Long Island Sound, W. by New York. Surface generally consists of three great river valleys, Connecticut flowing through middle of state, Thames through E., and Housatonic through W. Other rivers are affluents of these. In E. and W. are hilly districts; highest peaks, Bear and Gridley Mts. Chief towns are Hartford (cap.), New Haven, Bridgeport. Climate is temperate. Average annual rainfall, 50 in.

River valleys are fertile, especially that of Connecticut r.; produce corn, rye, oats, potatoes, wheat, buckwheat, and great quantities of hay; tobacco largely cultivated; fruits produced, including apples, peaches; horses, cattle, sheep, and pigs raised; dairying carried on; fine lobster and oyster fisheries along coast. Minerals include brownstone, iron ore, tungsten, nickel, lime, cobalt, trap-rock. Mineral springs occur in various places. Connecticut is great industrial state, manufacturing cottons, woolens, silks, paper, machinery, clocks, brass goods, rubber articles, hosiery, leather, etc.; watchmaking at Waterbury, firearms and machinery at Bridgeport, hats at Danbury. Chief harbors are Stonington, Mystic, New London.

History.—Dutch settlement was established at Hartford in 1633, and soon afterwards an Eng. trader founded trading station at Windsor. Wethersfield was settled by colonists from Massachusetts Bay in 1634, and in 1639 united with Hartford and Windsor as Connecticut colony. Meantime, in 1635 fort was established at Saybrook, called after Lord Saye and Sele, who had obtained patent for this district in 1631. In 1637 the Pequot Indians were subdued, and in 1638 Puritan colonists made settlement at New Haven. Saybrook was united to Connecticut in 1644. Charles II. granted autonomy by charter in 1662, when New Haven was annexed. Connecticut repudiated allegiance to mother country in 1776, and became independent state. New constitution was framed in 1818, whereby Church and State were disunited. Connecticut has greatly developed since Civil War, in which it supported Union; one of the thirteen original states of the Union.

Executive is in hands of governor, assisted by lieut.-governor and three officials; legislative power vested in general assembly, consisting of senate and house of representatives, elected for two years. Connecticut sends two senators and five representatives to Congress. Education is free and obligatory. Yale University is in New Haven. The Inhabitants include whites, negroes (*c.* 16,000), Asiatics, Indians; whites comprise persons of Brit., Ger., and Canadian birth. Railway mileage, 1,000. Area, 5,004 sq. m.; pop. 1920, 1,380,585.

CONNECTICUT COLLEGE FOR WOMEN, an educational establishment opened in New London, Conn., in 1915. The college was founded on an endowment gift of $1,250,000 bestowed by Morton F. Plant, who also furnished the means for building the first two dormitories. Technical and vocational training for qualifying women for a professional career is provided. There are courses in music, fine arts, home economics, secretarial work, physical education, etc. The college has a campus of 340 acres overlooking the Thames river. In 1922 there was a student roll of 289 and a teaching staff of 42 headed by B. T. Marshall.

CONNECTICUT RIVER (43° 35′ N., 72° 20′ W.), river, New England, U.S.A.; rises extreme N. of New Hampshire, flows S., forming boundary between New Hampshire and Vermont, through Massachusetts and Connecticut, and enters Long Island Sound at Saybrook.

CONNECTIVE TISSUES, tissues of the body which support and hold together the other tissues, composed of a large proportion of intercellular compared with cellular elements. This intercellular material may consist mainly of white fibres with a varying number of elastic fibres, or it may be cartilaginous or bony. Where the white fibres predominate, running closely together, the tissue is called *fibrous tissue*; found in positions where strength is required to resist strain, *e.g.*, joint ligaments. When the fibres interlace, leaving more or less space between each other, the tissue is known as *areolar tissue*; found, (*e.g.*,) just beneath the skin, joining it to the deeper structures. There may be fat deposited to a considerable extent in the cells of the tissue, which is somewhat dense, with the cells close together, and it is then called *adipose tissue*; found beneath the skin, around certain organs, etc. Where the fibres which predominate are elastic fibres, (*i.e.*,) composed of a substance *elastin*, which makes them springy or elastic, the tissue is named *elastic tissue*; found, (*e.g.*,) in the *ligamentum nuchoe* at the back of the neck.

CONNELLITE ($Cu_{15}(ClOH)_4SO_{16},15H_2O$), rare mineral occurring in tufts of blue needle-shaped crystals with other copper minerals, in Cornwall and S. Africa.

CONNELLSVILLE, a borough in Pennsylvania, in Fayette co. It is on the Baltimore and Ohio, the Pennsylvania and other railroads and on the Youghiogheny river. It is an important industrial city. Pop. 1920, 13,804.

CONNEMARA (53° 23′ N., 9° 30′ W.), wild, picturesque district, W. division, County Galway, Ireland.

CONNERSVILLE, a city of Indiana, in Fayette co., of which it is the county seat. It is on the Cincinnati, Hamilton and Dayton, the Cleveland, Cincinnati, Chicago and St. Louis, and other railroads, and on the White River. Among its industries are manufactures of automobiles, pianos, furniture, flour, etc. There is a public library, park and sanitarium. Pop. 1920, 9,901.

CONNICK, CHARLES JAY (1875), an American artist in stained glass, *b.* at Springboro, Pa., *s.* of George Herbert and Mina Mirilla Trainer Connick. Following a public school education he attended night classes in life drawing at Pittsburgh and later studied at the Boston Art Club and the Copley Society followed by research work and the study of old glass in England and France. After being sixteen years in the employ of various firms in Pittsburgh, Boston and New York as a designer, he engaged in business on his own account in 1913, and designed many important windows including the chapel of St. John the Divine Cathedral, and the Holy Grail Window at Princeton University.

CONNOLLY, JAMES BRENDON (1868), author, *b.* Boston, Mass. He was educated in the public and parochial schools of his birthplace and studied science at Harvard. He acted as clerk, inspector and surveyor in the U.S. Engineering Corps at Savannah from 1890 to 1895. As an athlete he won the first Olympic championship of modern times at Athens in 1896. He joined the army in the war with Spain, enlisting in the Ninth Massachusetts Infantry and took part (1898) in the seige of Santiago. Later he became a popular writer of sea stories, meantime serving in the U.S. Navy for two years. His books include *Jeb Hutton, Out of Gloucester, The Seiners, The Deep Sea's Toll, The Crested Seas, An Olympic Victor, Open Water, Wide Courses, Connie Boy's People, The Trawler, Headwinds, Running Free, The U-Boat Hunters*, 1918; and *Hiker Joy*, 1920. In 1912 he was a Progressive candidate for Congress.

CONNOR, RALPH, otherwise the Rev. Charles William Gordon (1860), Canadian author; *b.* Glengarry, Ontario. He was educated at Toronto University and Knox College, from which he graduated in 1883 and 1887 respectively. Ordained to the Presbyterian ministry, he served as a missionary among the miners and lumber jacks in the Canadian Rockies, from 1890 to 1893. The next year he became pastor of St. Stephen's Church in Winnipeg. The Canadian West inspired him to authorship, his works being very striking for their local color and characterization. They include *Black Rock, The Sky Pilot, The Man from Glengarry, The Prospector, The Major, The Dawn by Galilee*, and *The Recall of Love.* His pastoral and literary activities attracted him to social service work with which he became closely identified. He was admitted as a fellow of the Royal Society of Canada and received the degrees of D.D. from Knox College and LL.D. from Queen's University.

CONNOTATION, in logic signifies all the attributes implied by any term, as distinguished from its *denotation.*

CONODONTS, sharp conical fossils said to be teeth of fish of lamprey species, or of denticles annelid type; found in Palæozoic strata.

CONOID (geom.), solid or surface formed by revolution of a conic section about its axis; a circle, ellipse, parabola, and hyperbola generating the solids or surfaces known as sphere, spheroid, paraboloid, and hyperboloid respectively.

CONON, celebrated Athenian general who defeated the Lacedæmonians at Cnidus, 394 B. C.

CONON OF SAMOS (fl. III. cent. B. C.), Gk. mathematician and astronomer; friend of Archimedes; compiled a calendar; wrote seven books on astronomy, and was an authority on curves (conic sections). He is credited with having given the name *Coma Berenices* to that constellation.

CONQUEST, a total defeat of enemy, often followed by annexation of whole or part of his territory. International law recognizes title of conqueror; only pretext for interference of neutral states is that their interests are affected, directly or by alteration of 'balance of power.'

CONRAD, OR CONRADIN, THE YOUNGER (1252-68), king of Jerusalem and Sicily; last of Hohenstaufens; excommunicated, 1267; beheaded by Charles of Anjou.

CONRAD II. (*c.* 990-1039), Emperor of Holy Roman Empire, 1027; great-grandson of Otto I., reviver of Rom. Empire; extended boundaries of Germany, completing absorption of 'Middle Kingdom' by winning Burgundy, 1032; reunited Italy and Germany.

CONRAD III. (1093-1152), first Hohenstaufen king of Germany; elected, 1127; king of Italy, 1128; displaced by rival Lothair, but restored, 1138.

CONRAD IV. (1228-54), Ger. king.

CONRAD, JOSEPH (1857), Eng. novelist, was born in the Ukraine, his full name being Joseph Theodore Conrad Korzeniowski. He went to sea at an early age, became a master in the

Eng. merchant service, and shortly after retiring pub. his first novel, *Almayer's Folly*, 1895. This was followed by *An Outcast of the Islands*, *The Nigger of the Narcissus*, *Lord Jim*, *Youth*, *The Heart of Darkness*, *Typhoon and Other Stories*, etc. Though Mr. Conrad did not learn English till he was twenty he is a master of style. In actuality he approaches Kipling, and he is unsurpassed as a novelist of the sea. Among his later works are *Chance*, *A Personal Record*, *The Shadow Line*, and *The Arrow of Gold*, *Rescue*, and *Notes on Life and Letters*.

CONRAD OF MARBURG (1180-1233), Ger. ecclesiastic, renowned as preacher, particularly against 'heretics,' at court of St. Elizabeth of Hungary.

CONRART, VALENTIN (1603-75), Fr. scholar; one of the founders and first sec. of Fr. Academy.

CONSALVI, ERCOLE (1757-1824), Ital. statesman and ecclesiastic; chamberlin of pope, 1783; organized papal army to meet armies of Fr. revolution; mprisoned in Castle of St. Angelo, 1798; deported to Naples and escaped; made cardinal-deacon and chief minister on instatement of Pope Pius VII., 1800; by his diplomacy offensive articles were omitted by Napoleon from *Concordat* between France and Rome.

CONSANGUINITY, blood relationship, distinct from affinity, which is marriage relationship; direct c. is between parents and children, collateral between brothers, sisters, etc.; Roman and papal law prohibited marriages between relatives within certain limits; custom relaxed after Reformation; a table of kindred and affinity still appears in the Prayer Book.

CONSCIENCE, term generally used to describe that sense which enables man to differentiate between right and wrong.

CONSCIOUSNESS, word implying full mental power and perception; opposed to unconsciousness (produced by sleep, drugs, or accident), in which mental powers are in abeyance.

CONSCRIPTION, or what is termed Compulsory Military Service—although strictly, the term is applicable only to selection by lot—was introduced in modern times by Napoleon in 1798, and adopted by Prussia in the reconstruction of its army after Jena, and after the Franco-Prussian War, 1870-1, by all the great Continental powers. In the Amer. Civil War both sides had resort to conscription, and when the United States entered the World War compulsion to serve in the army was applied on the principle of the selective draft.

CONSECRATION, the making holy any person, place, or thing, has been common in most religions. The idea is that he or it is specially set apart for divine purposes; a person or thing may likewise be 'devoted' to evil. Holiness is therefore a sort of supernatural quality which can be conferred by ceremonial. More loosely, c. is used of devoting to a special purpose without a necessary supernatural or sacramental element. Thus we speak of a person consecrating' his life to certain work.

CONSERVATION, a term applied to a movement aiming at retrenchment in the wasteful use of natural resources. It may be said to have originated in the United States, where indiscriminate exploitation of the country's forests, pasture lands, mines, water power, animal life and other resources began to arouse public concern with the opening of the 20th century. Vigorous government action during the Roosevelt administration stimulated the movement to such a degree that conservation became a defined national policy.

President Roosevelt has been regarded as the father of the conservation movement. At any rate his energetic support of it brought about, in 1908, a co-ordination of forces for the systematic safeguarding of the remaining resources by a White House conference of experts, who deliberated the subject exhaustively. The outcome of this meeting was the creation of the National Conservation Commission, which duly evolved into two bodies now existing, namely, the National Conservation Association, headed by Gifford Pinchot, Governor of Pennsylvania, who was chief of the Forestry Division under President Roosevelt, and the National Conservation Congress.

Earlier steps both to check waste and increase the fertility of our natural resources had been taken by the Roosevelt administration. Far-reaching plans were developed for the reclamation and settlement of arid public lands, the realization of which has gone on year after year since. The national forests were placed under the administration of the Forest Service and grazing in them controlled. A Public Lands Commission came into being to examine closely the federal land laws and recommend changes in their operation, both administrative and legislative. A system of water-power leases in the national forests was also adopted and enforced. Private appropriation of water power sites on public lands outside the forests became checked.

Later, under succeeding administrations, the federal government acquired the right of reservation of the mineral contents of public lands, such as underlying deposits of coal, oil, gas and asphalt. Other measures passed included a treaty with Canada regulating the use of the waters of Niagara; the creation of the Appalachian and White Mountain forest preserves; the establishment of the Federal Bureau of Mines; the migratory bird law; and control of railroad and coal leases in Alaska to restrain undue private exploitation of the territory's resources.

In recent years there has not been any marked conservation legislation, but the subject, which President Roosevelt viewed as constituting the fundamental problem underlying almost every other problem of our national life, is steadfastly pursued by a number of active bodies. The National Conservation Association, for example, promotes popular support of federal and state measures for protecting natural resources. It scrutinizes all federal conservation legislation, advises on similar measures projected by States, and issues a considerable amount of conservation literature in various forms. The other leading body, the National Conservation Congress, meets annually in selected cities to ventilate the importance of public recognition of the country's natural resources as the foundation of every citizen's welfare, and invites representatives from States, universities, commercial and civil organizations, and other institutions to participate in the discussions. It also furnishes information regarding the development, use and preservation of natural resources.

Other national bodies devoted to various fields of conservation include the American Forestry Association, the Society of American Foresters, the American Game Protective Association, the National Association of Audubon Societies, the League of American Sportsmen, the National Association of Shellfish Commissioners, and the American Scenic and Historic Preservation Society.

CONSERVATION OF ENERGY. See Energy, Conservation of.

CONSERVATIVE PARTY, in Gt. Britain, the political party which seeks to preserve unity of existing institutions; 'Conservative' first applied to Tory Party, 1830; The Unionist Party, formed by a split in Liberal Party owing to Home Rule, supported C.P. in power and in opposition from 1886; the two formed an alliance, 1895, and united their organizations, 1911-12. The
party's program, 1913, includes Pre
ervation of the Union, Tariff Refor
and Imperial Preference (many Fr
Traders dissenting), strong navy. Durin
period, 1837-1913, Liberals held offic
for 47 and Conservatives for 29 year
C. Premiers who have held office a
Disraeli, 1868, 1874-80; Salisbury, 188
1886-92, 1895-1900, 1900-2; Balfou
1902-5.

The Conservative Party again cam
into power in 1922, following the defe
of Lloyd George and the Coalitio
cabinet. Andrew Bonar Law becam
premier. The Conservatives had a sa
majority but were opposed by a stron
minority of the Labor Party, whic
elected 142 members of Parliament.

CONSERVATORY, structure, main
of glass, intended for the housing
delicate ornamental plants; usual
built as an adjunct to a house and heate
artificially.

CONSHOHOCKEN, a borough
Pennsylvania, in Montgomery co.
is on the Pennsylvania, and the Pennsy
vania and Reading railroads, and on t
Schuylkill River. It is an importa
industrial community and has rolli
mills, foundries and furnaces, an
cotton and woolen mills, steel mills, et
Pop. 1920, 8,481.

CONSISTORY, at first the audien
chamber of the Rom. emperors, then t
audiences themselves; used later
episcopal tribunals, but now practicall
only of the Papal C., consisting of t
pope and the coll. of cardinals. Thes
meetings are mostly formal, their d
liberative functions having bee
dropped.

CONSONANT. See Speech.

CONSORT (Lat. *consors*, partner)
associate, particularly spouse, applie
to husband or wife of Brit. sovereign
queen c. has position regulated by law

CONSPIRACY (Lat. *conspiratio*)
illegal agreement between two or mor
persons to act unlawfully or to commi
acts which become unlawful when pe
formed by more than one person. Suc
acts fall under these headings: (1
Conspiracy to commit actionable offense
(2) False charging of another wit
actionable offense from malice or wis
to blackmail. (3) Conspiracy fo
injuries, such as raising price of goods i
markets, etc., and obtaining goods unde
false pretenses. (4) Conspiracy t
pervert course of justice. (5) Attempts t
profit corruptly by working of the law

CONSTABLE (M.E., from O. Fr
conestable, from Late Lat. *comes stabuli*
count of the stable.)—(1) Title of hea

groom of stable under later Rom. emperors, applied early by Frankish kings to chief household official; this usage became general. (2) Different national usages in nearly all of which there is military idea: (*a*) In France, title of commander-in-chief of army, regulator of tournaments, etc., until 1627; office revived for short period under Napoleon.

CONSTABLE, HENRY (1562-1613), Eng. poet; best known for his sonnets.

CONSTABLE, JOHN (1776-1837), Eng. artist; *b.* East Bergholt, Suffolk; *f.* was a miller, and in this employment many of C.'s earlier years were spent; first exhibited at Royal Academy, 1802; A.R.A., 1819, and R.A., 1829. Amongst most famous works are *Flatford Mill*, *The Leaping Horse*, *The Cornfield*, and *Dedham Vale.*

CONSTANCE, KONSTANZ (47° 39′ N., 9° 11′ E.), town, Baden, Germany, at exit of Rhine from Lake Constance; fragments of ancient walls (IV. cent.); chief edifices, cathedral (founded XI. cent.), old Dominican convent (now a hotel), XIV.-cent. Kaufhaus; 'Council of Constance' met here, 1414-18; textiles. Pop. 30,000.

CONSTANCE, COUNCIL OF, an rregular council of the Church, held at Constance (Baden) from Nov., 1414, to April, 1418, to end the dissensions in the Church, and repress the doctrines of Wycliff and John Huss. Pope John XXIII· was deposed by the Council, and his rivals Gregory XII. and Benedict XIII. were forced to resign. Martin V. was then elected to the Papacy, and as he did not unreservedly approve the acts of the Council, it is held to be only partly œcumenical. Wycliff's teaching was condemned, and Huss and Jerome of Prague burnt at the stake, in spite of safe conducts from the emperor.

CONSTANCE, LAKE, BODENSÉE (47° 35′ N., 9° 25′ E.), between Switzerand and Germany; traversed by Rhine S. E. to N. W.; area, *c.* 205 sq. miles; Rom. *Lacus Brigantinus.*

CONSTANT, BENJAMIN (1845-1902), Fr. artist; noted for his portraits, and studies of Eastern subjects.

CONSTANT DE REBECQUE, HENRY BENJAMIN (1767-1830), Fr. publicist and orator, of Swiss origin; adopted democratic ideal of society in default of better.

CONSTANTIA (34° 3′ S., 18° 27′ E.), district, Cape of Good Hope, S. Africa, on N. N. E. slopes of Table Mountain; wine.

CONSTANTINE, name of many Rom. emperors.—Constantine I., Flavius Valerius Constantinus (*c.* 288-337), *the Great*; illegitimate *s.* of Emperor Constantinus I. Already famous as general, he was proclaimed *Augustus* by army at his *f.*'s death, 306, but waited six years before seizing supreme power; epoch-making rule; Christianity not only tolerated but made state religion; an incorrect tradition ascribes C.'s conversion to his mother, Helena; capital removed, 326-30, from Rome to Byzantium (*Constantinople*); reign shows completion of process by which Rom. republic became absolute despotism, C. entailing rule on his family, creating new nobility, and leaving mere shadow of power to senate; period of prolific legislation. His *s.*, Constantine II., 317-40, acquired name *Alemannicus* from victories over Alemanni.—Constantine IV. (emperor, 668-85) repulsed attacks of Arabs and extorted tribute from them, but was forced to allow Bulgars to colonize modern Bulgaria, 679. He summoned 6th Œcumenical council, which condemned Monothelitism.—Constantine V. (emperor, 640-75), iconoclast; held synod, 754, forbidding image-worship, and exiled monks as upholders of same, with result that Rom. Church permanently severed connection with Constantinople; able soldier and general. His grandson, Constantine VI. (emperor, 780-97), aged 10 at his accession, was completely ruled by *m*, Irene, and blinded after disastrous rule.—Constantine VII. (905-59), '*Porphyrogenitus*' (born in the purple), Byzantine emperor and writer of important books of history, war, law, agriculture, etc.—Constantine VIII. (joint-emperor, 976-1025, sole ruler, 1025-28), decadent; empire controlled by eunuchs.—Constantine IX. (1042-54) lost Lombardy. Turks made appearance.—Constantine X. (1059-67) finally lost Ital. possessions; inroads of Turks and Magyars.

CONSTANTINE I. (1868-1923), ex-King of Greece, succeeded to the throne on the assassination of his father, King George; was popular on account of his success as a commander during second Balkan War; proved from his accession an autocratic king. Militarist and Prussian in spirit, his sympathies were all with the Central Powers during the World War. His refusal of proposal of M. Venizelos for intervention in Gallipoli, March 1915, led to the minister's retirement and to the succession of the pro-German M. Gounaris; but in June of the same year Venizelos was returned to power by popular vote. Thereafter Constantine pursued a treacherous policy, hampering the movements of French, British, and Serbian troops, which resulted in the blockade of Greece by the Allies, and in the king's open rupture with Venizelos, who proclaimed a provisional government, Sept. 1916. Finally the situation was ended by the expulsion of Constantine from Greece, June 1917, and the succession of his second son, Alexander who died in Oct. 25, 1920. In the November elections Constantine's opponents were defeated and he was recalled by a plebiscite in December 1920. Following the Greek reverses in 1922 Constantine was obliged to abdicate, and died in exile Jan. 9, 1923. See GREECE.

CONSTANTINE (*d.* 410 A. D.), Rom. soldier in Britain, who usurped the purple during the reign of Honorius; afterwards defeated and put to death.

CONSTANTINE (36° 20′ N., 6° 33′ E.), fortified town, Algeria; situated on rocky hill, with ravines surrounding it on three sides; episcopal see; has citadel, mosques, Bey's palace; manufactures woolens, leather goods; Rom. remains; was important city of Numidia; sacked, 311, A. D.; rebuilt by Constantine; taken by French, 1837. Pop. 70,000.

CONSTANTINOPLE, cap. of Turk. Empire (41° 2′ N., 28° 57′ E.); built on several hills; uniquely situated, and one of most beautiful cities in Europe; surrounded on three sides by water; Sea of Marmora and Bosporus on S. and E.; W. side is walled; and on the N. side, the inlet called the Golden Horn separates the city proper (called by Turks *Istambol* or *Stambul*) from the Christian town, forming a safe, spacious, and deep harbor, about five miles long and half a mile broad, bridged at two points. Christian Constantinople comprises: (1) Galata, the merchants' quarter (in which is the Genoese Tower of Galata, used for giving fire-alarms); (2) Pera, the aristocratic quarter, containing embassies and consulates—the ill-paved Grande Rue with its fine shops, cafés, restaurants, hotels is reached by tunnelled railway; (3) Tophane (with cannon factory), mostly inhabited by Turks, embraces the beautiful Palace of Dolma-bagche on banks of Bosporus. Stambul lies to the S., and contains most of the finest buildings —*e.g.*, the Mosque of St. Sophia, built (532-58) in Byzantine style and originally intended for a Christian church, but converted into mosque by Mohammed II.; outside it is plain, but the interior, with its dome, marbles, and mosaics, is of marvelous beauty. There are in all 800 mosques, a magnificent one being that of Sultan Soliman, the Magnificent; and the Hippodrome, with remains of Gr. arch. In extreme S. E. stands the old Serai, within whose high walls were the divan and harem of former sultans, and whose famous gate (Sublime Porte) has given its name to the sultan's government; a new seraglio was built by Abdul Medjid N. of the old one. The streets are mostly ill-paved and crooked; the houses are low and small, and business is transacted in bazaars.

Constantinople was founded, as Byzantium, in 7th cent. B. C.; rebuilt and made cap. of Roman Empire by Constantine the Great in A. D. 330; cap. of Byzantine or Eastern Empire for over 1,100 years; captured by crusaders (1203-4); taken and made cap. of Ottoman Empire by Mohammed II. in 1453. Here many treaties have been concluded; abortive conference to settle Eastern question, 1876-7; massacres of Armenians, 1895-6; sultan accepted constitution of Young Turks, 1908; Abdul Hamid exiled and Mohammed V. set up; Ger. influence dates from visit of William II., 1898; in Balkan War, 1912-13, as in World War, city saved by natural strength of its position; Brit. submarines torpedoed vessels even in Golden Horn, airmen bombed the city; armistice arranged, Oct. 30, 1918, and on Nov. 13 Allied fleet arrived; Fr. troops occupied the city.

By the terms of the Treaty Sévres in 1920, Constantinople was to remain as the capital of Turkey, with the reservation that if Turkey failed to observe the provisions of the treaty, it might be modified by the Powers. As a matter of fact, the conditions of the Treaty of Sévres were never carried out. Constantinople was administered by a commission of the Allied Powers in which Great Britain was predominant. Late in 1922 Constantinople was threatened by Mustapha Kemal and actual hostilities between the Turks and the British, who alone had military force there, was averted only by timely negotiations. By the terms of the Treaty of Lausanne, 1922-23, Constantinople was to remain in the absolute control of the Turks, who are to guarantee freedom of the Straits to vessels of commerce and to vessels of war, except under certain specified conditions. See LAUSANNE, CONFERENCE OF; TURKEY.

CONSTANTINOPLE, COUNCILS OF.—The chief are: (1) the second œcumenical council, 381, confirming articles of Nicene Creed and granting metropolitan status to bishoprics of Alexandria, Antioch, Thrace, Pontus, and Ephesus.—(2) The fifth œcumenical c., 553, condemning the 'Three Chapters.' —(3) The sixth œcumenical c., 680-81, condemning Monothelitism.—(4) Synod of 869, considered by Latin Church as eighth œcumenical c.; declared in favor of Ignatius against Photius for bishopric of Constantinople.—(5) Synod of 879 regarded by Gk. Church as eighth œcumenical c.; declared for Photius.

CONSTANTIUS, FLAVIUS VALERIUS (*c.* 250-305 A. D.), Rom. emperor.

CONSTANT PROPORTIONS, LAW OF. See CHEMISTRY.

CONSTANTZA, KUSTENDJI (44° 12′ N., 28° 41′ E.), seaport, on Black Sea, Rumania; near ruins of Tomi; Ovid's place of exile; large transit trade in grain and petroleum through railway to Bucharest.

CONSTELLATION, group of stars. From the earliest times stars have been segregated by man into artificial groups, which have been given names, chiefly derived from animals and Gk. mythology. Northerns c.'s are Andromeda, Aquila (Eagle), Auriga (Charioteer), Boötes (Ploughman), Camelopardus (Giraffe), Canes Venatici (Hunting Dogs), Cassiopeia, Cepheus, Coma Berenices (Bernice's Hair), Corona Borealis (Northern Crown), Cygnus (Swan), Delphinus (Dolphin), Draco (Dragon), Equuleus (Foal), Hercules, Lacerta (Lizard), Leo Minor (Little Lion), Lynx (Lynx), Lyra (Lyre), Ophiuchus or Serpentarius (Serpent-Holder), Pegasus, Perseus, Sagitta (Arrow), Serpens (Serpent), Triangulum (Triangle), Ursa Major (Great Bear), Ursa Minor (Little Bear), Vulpecula et Anser (Fox and Goose). Zodiacal c.'s; Aquarius (Water-Carrier), Aries (Ram), Cancer (Crab), Capricornus (Goat), Gemini (Twins), Leo (Lion), Libra (Scales), Pisces (Fishes), Sagittarius (Archer), Scorpio (Scorpion), Taurus (Bull), Virgo (Virgin). Southern c.'s: Antlia [Pneumatica] (Air-Pump), Apus (Bird of Paradise), Argo (Ship), Cælum (Sculptor's Tool), Canis Major (Great Dog), Canis Minor (Little Dog), Carina (Keel), Centaurus (Centaur), Cetus (Sea-Monster), Chamæleon, Circinus (Compasses), Columba Noachi (Noah's Dove), Corona Australis (Southern Crown), Corvus (Crow), Crater (Bowl), Crux Australis (Southern Cross), Dorado (Sword-Fish), Eridanus, Fornax Chemica (Chemical Furnace), Grus (Crane), Horologium (Clock), Hydra (Sea-Serpent), Hydrus (Water-Snake), Indus (Indian), Lepus (Hare), Lupus (Wolf), Malus (Mast), Mons Mens (Table Mountain), Microscopium (Microscope), Monoceros (Unicorn), Musca Australis (Southern Fly), Norma (Rule), Octans (Octant), Orion, Pavo (Peacock), Phœnix, Pictor (Painter), Piscis Australis (Southern Fish), Puppis (Stern), Reticulum (Net), Sculptor, Scutum Sobieskii (Shield of Sobeski), Sextans (Sextant), Telescopium (Telescope), Toucan, Triangulum Australe (Southern Triangle), Vela (Sails), Piscis Volans (Flying Fish).

CONSTIPATION, condition in which the fæces are retained unduly in the bowels, through interference with the digestive functions, due frequently to sedentary habits, change of diet or habits, nervous diseases, disease affecting the general system, (*e.g.*) anæmia, Bright's disease, and to other similar causes.

CONSTITUTION (Lat. *constitutio.* regulation, especially imperial order, equivalents of imperial *constitutiones* are to be found in Eng. mediæval 'Constitutions' of Clarendon, etc.).—Political organization; founded not merely on law, but custom. Chief forms are: monarchical, aristocratic, and democratic. The commencement of theorizing as to their relative advantages is to be found in Aristotle's *Politics*.

'Constitution of Athens,' a treatise written on papyrus, found in Egypt, and now in Brit. Museum, is considered by scholars to be a copy of a work on the Athenian C. written by Aristotle (*d.* 322 B. C.). It has been edit. and pub., 1891.

U.S. and France are examples of written c.'s, Great Britain of unwritten c. 'Constitutional' action is action in accordance with c.; 'constitutional' party, party which strives to keep c. intact, but 'constitutional' government has acquired different meaning from use of Brit. politics. It signifies limitation of power of head of government by representatives of the governed in similar manner to limitation of power of Brit. crown by Parliament.

CONSTITUTION OF THE UNITED STATES, an instrument embodying the principles upon which the government of the American republic is conducted. It was adopted in 1787 and displaced the Articles of Confederation, which had formed the fundamental law. Under the Articles the new republic was a loose confederation of states, in which the central government had little power. The latter could not enforce any authority over individual states and had only one legislative chamber, which could not act in the exercise of its more important powers without a prior affirmative vote of at least nine of the thirteen states. The central government in general had control over foreign relations and could declare and wage war, yet could not enforce the states to accept treaty obligations with other countries. Neither could it effectively control foreign commerce nor levy taxes.

The constitution was framed to remedy the defects of government, due to the operation of the Articles. It was the outcome of a convention of the States held in Philadelphia in 1787, lasting almost four months, from May 29 to Sept. 17, and represented compromises—between a national party and a state sovereignty party and also between factional state parties. It created a federal executive and judiciary that had not existed before. It adjusted issues between states on the subject of representation in the national body, the larger state party demanding legislative representation based on population, while the smaller state party wanted all states to have equal representation, by a lower house in which representation was based on population, and an upper house representing the States as States; as, in fact, the House and Senate do today. The constitution's framing also involved the adjustment of issues between slave states and free states. The new instrument of government was approved by Congress, and received the ratification of all the thirteen states by 1790, though few of them were really satisfied with it. George Washington, Benjamin Franklin, Alexander Hamilton, and Gouverneur Morris were among the leading figures concerned in its framing. The document contained seven articles, but since its adoption nineteen other articles, or amendments, have been added to it.

The first article created a Congress composed of a Senate and House of Representatives, named the conditions and the method of election of their members, and determined their powers and procedure as the legislative branch of the government. It conferred on Congress, among other powers, the authority to raise taxes, borrow money, regulate commerce, control naturalization, establish post-offices, declare war and maintain an army and navy, and also specified what the states may not do except with the consent of Congress.

The second article dealt with the executive power, the conditions and methods of electing a President and Vice-President, and the scope of the President's authority and duties. It gave the Chief Executive power to reprieve or pardon, except in impeachment cases; to make treaties and fill diplomatic and judicial posts with the consent of the Senate; to veto bills passed by Congress; and made him commander-in-chief of the army and navy.

The third article established the federal judiciary, represented by the Supreme Court and inferior tribunals as established by Congress. It defined their power as embracing all cases arising under the Constitution and United States laws, including treaties; cases affecting ambassadors and public ministers; maritime jurisdiction; litigation in which the United States is a party; issues between states, or between a state and citizens of another state, or between citizens of different states; or cases in which foreign governments or their nationals are concerned with Americans. The article also defined treason.

Interstate and territorial relations were covered by the fourth article, which provided for extradition from one state to another; the admission of new states into the Union; the combining or division of States; the control of territories by Congress; federal control of the constitutional provisions of would-be States to ensure a republican form of government; and federal protection of States when their peace is menaced.

The sixth article specified the powers of the Constitution itself and the laws and treaties made under it as the Supreme law of the land, binding on judicial officers, and the seventh article set forth the conditions of its ratification by the States.

Amendments to the Constitution safeguarding individual liberty, so that the rights of citizens may not be encroached upon by the Federal Power were added in 1791. These new articles were ten in number. They provided for religious liberty, freedom of speech and the published word, the right to bear arms, protection of persons and property from search and seizure without warrant, jury trials for serious crimes and other matters relating to the dispensing of justice; and reserved to the States respectively, or to the people all powers not delegated by the Constitution to the United States or powers whose exercise by the States are not prohibited.

The twelfth amendment to the new series of articles was ratified in 1803 and provided for the existing formality of electing the President and Vice-President by ballot of the electors after the presidential vote by the people at large has been determined. There were no further additions till after the Civil War, when the thirteenth, fourteenth and fifteenth amendments were ratified between 1865 and 1870. They related o the bestowal of citizenship on liber- ted slaves. The twelfth forbade lavery; the thirteenth denied to the tates the power to abridge the privi- eges and freedom of citizens of the Jnited States; the fifteenth placed a imilar veto on the power of States to estrict the right of citizens to vote ecause of race or color.

The next series of amendments began n 1913, when provisions were made for evying an income tax (Sixteenth Amend- nent) and the election of Senators by opular vote (Seventeenth) instead of y the State legislatures, as heretofore. The eighteenth amendment, finally atified in January, 1919, provided for ational prohibition of the use of ntoxicating liquors; the nineteenth, atified in August, 1920, gave women he right to vote.

In 1923 a further amendment was ending in Congress, having passed the enate, changing the date for the meet- ng of Congress to the first Monday in anuary and the inauguration of the President two weeks after, instead of n March 4.

The American Constitution is funda- nentally democratic, endowing sovereign ower on the people, who delegate its xercise to representative chambers and lective officials.

Following is the text of the Constitu- ion and the Amendments:

PREAMBLE

We, the people of the United States, n order to form a more perfect Union, stablish justice, insure domestic tran- uility, provide for the common defense, romote the general welfare, and secure he blessings of liberty to ourselves and ur posterity, do ordain and establish his Constitution for the United States f America.

ARTICLE I.

Section 1—(Legislative power; in whom vested.)

All legislative powers herein granted, hall be vested in a Congress of the Jnited States, which shall consist of a enate and House of Representatives.

Section 2—(House of Representatives, how and by whom chosen. Qualifications of a Representative. Representatives and direct taxes, how apportioned. Enumeration. Vacancies to be filled. Power of choosing officers, and of impeachment.)

1. The House of Representatives shall e composed of members chosen every econd year by the people of the several tates, and the electors in each State hall have the qualifications requisite or electors of the most numerous branch f the State of Legislature.

2. No person shall be a Representative who shall not have attained to the age of twenty-five years and been seven years a citizen of the United States, and who shall not, when elected, be an inhabitant of that State in which he shall be chosen.

3. Representatives and direct taxes shall be apportioned among the several States which may be included within this Union according to their respective numbers, which shall be determined by adding to the whole number of free persons, including those bound to service for a term of years, and excluding Indians not taxed, three-fifths of all other persons. The actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct. The number of Representatives shall not exceed one for every thirty thousand, but each State shall have at least one Representative; and until such enumeration shall be made, the State of New Hampshire shall be entitled to choose 3; Massachusetts, 8; Rhode Island and Providence Plantations, 1; Connecticut, 5; New York, 6; New Jersey, 4; Pennsylvania, 8, Delaware, 1; Maryland, 6; Virginia, 10; North Carolina, 5; South Carolina, 5, and Georgia, 3.*

(*See Article XIV., Amendments.)

4. When vacancies happen in the representation from any State, the Executive Authority thereof shall issue writs of election to fill such vacancies.

5. The House of Representatives shall choose their Speaker and other officers, and shall have the sole power of impeachment.

Section 3—(Senators, how and by whom chosen. How classified. State Executive, when to make temporary appointments, in case, etc. Qualifications of a Senator. President of the Senate, his right to vote. President pro tem., and other officers of the Senate, how chosen. Power to try impeachments. When President is tried, Chief Justice to preside. Sentence.)

1. The Senate of the United States shall be composed of two Senators from each State, chosen by the Legislature thereof, for six years; and each Senator shall have one vote.

2. Immediately after they shall be assembled in consequence of the first election, they shall be divided as equally as may be into three classes. The seats of the Senators of the first class shall be vacated at the expiration of the second year, of the second class at the expiration of the fourth year, and of the third class at the expiration of the sixth year, so that one-third may be chosen every

second year; and if vacancies happen by resignation, or otherwise, during the recess of the Legislature of any State, the Executive thereof may make temporary appointment until the next meeting of the Legislature, which shall then fill such vacancies.

3. No person shall be a Senator who shall not have attained to the age of thirty years, and been nine years a citizen of the United States, and who shall not, when elected, be an inhabitant of that State for which he shall be chosen.

4. The Vice-President of the United States shall be President of the Senate, but shall have no vote unless they be equally divided.

5. The Senate shall choose their other officers, and also a President pro tempore, in the absence of the Vice-President, or when he shall exercise the office of President of the United States.

6. The Senate shall have the sole power to try all impeachments. When sitting for that purpose, they shall be on oath or affirmation. When the President of the United States is tried, the Chief Justice shall preside; and no person shall be convicted without the concurrence of two-thirds of the members present.

7. Judgment of cases of impeachment shall not extend further than to removal from office, and disqualification to hold and enjoy any office of honor, trust, or profit under the United States; but the party convicted shall nevertheless be liable and subject to indictment, trial, judgment, and punishment, according to law.

Section 4—(Times, etc., of holding elections, how prescribed. One Session in each year.)

1. The times, places, and manner of holding elections for Senators and Representatives shall be prescribed in each State by the Legislature thereof; but the Congress may at any time by law make or alter such regulations, except as to places of choosing Senators.

2. The Congress shall assemble at least once in every year, and such meeting shall be on the first Monday in December, unless they shall by law appoint a different day.

Section 5—(Membership, Quorum. Adjournment. Rules. Power to punish or expel. Journal. Time of adjournments, how limited, etc.)

1. Each House shall be the judge of the elections, returns, and of qualifications of its own members, and a majority of each shall constitute a quorum to do business; but a smaller number may adjourn from day to day, and may be authorized to compel the attendance of absent members in such manner and under such penalties as each House may provide.

2. Each House may determine the rules of its proceedings, punish its members for disorderly behavior, and with the concurrence of two-thirds expel a member.

3. Each House shall keep a journal of its proceedings, and from time to time publish the same, excepting such parts as may in their judgment require secrecy; and the yeas and nays of the members of either House on any question shall, at the desire of one-fifth of those present, be entered on the journal.

4. Neither House, during the session of Congress, shall, without the consent of the other, adjourn for more than three days, nor to any other place than that in which the two Houses shall be sitting.

Section 6—(Compensation. Privileges. Disqualification in certain cases.)

1. The Senators and Representatives shall receive a compensation for their services, to be ascertained by law, and paid out of the Treasury of the United States. They shall in all cases, except treason, felony, and breach of the peace, be privileged from arrest during their attendance at the session of their respective Houses, and in going to and returning from the same; and for any speech or debate in either House they shall not be questioned in any other place.

2. No Senator or Representative shall, during the time for which he was elected, be appointed to any civil office under the authority of the United States which shall have been created, or the emoluments whereof shall have been increased during such time; and no person holding any office under the United States shall be a member of either House during his continuation in office.

Section 7—(House to originate all revenue bills. Veto. Bill may be passed by two-thirds of each House, notwithstanding, etc. Bill, not returned in ten days, to become a law. Provisions as to orders, concurrent resolutions, etc.)

1. All bills for raising revenue shall originate in the House of Representatives, but the Senate may propose or concur with amendments, as on other bills.

2. Every bill which shall have passed the House of Representatives and the Senate shall, before it becomes a law, be presented to the President of the United States,; if he approve, he shall sign it, but if not, he shall return it, with his objections, to that House in which it shall have originated, who shall enter the objections at large on their journal, and proceed to reconsider it. If after such reconsideration two-thirds

of that House shall agree to pass the bill, it shall be sent, together with the objections, to the other House, by which it shall likewise be reconsidered; and if approved by two-thirds of that House it shall become a law. But in all such cases the votes of both Houses shall be determined by yeas and nays, and the names of the persons voting for and against the bill shall be entered on the journal of each House respectively. If any bill shall not be returned by the President within ten days (Sundays excepted) after it shall have been presented to him, the same shall be a law in like manner as if he had signed it, unless the Congress by their adjournment prevent its return; in which case it shall not be a law.

3. Every order, resolution, or vote to which the concurrence of the Senate and House of Representatives may be necessary (except on a question of adjournment) shall be presented to the President of the United States; and before the same shall take effect shall be approved by him, or being disapproved by him, shall be repassed by two-thirds of the Senate and the House of Representatives, according to the rules and limitations prescribed in the case of a bill.

Section 8—(Powers of Congress.)

1. The Congress shall have power: To lay and collect taxes, duties, imposts, and excises, to pay the debts and provide for the common defense and general welfare of the United States; but all duties, imposts, and excises shall be uniform throughout the United States.

2. To borrow money on the credit of the United States.

3. To regulate commerce with foreign nations, and among the several States, and with the Indian tribes.

4. To establish a uniform rule of naturalization and uniform laws on the subject of bankruptcies throughout the United States.

5. To coin money, regulate the value thereof, and of foreign coin, and fix the standard of weights and measures.

6. To provide for the punishment of counterfeiting the securities and current coin of the United States.

7. To establish post-offices and post-roads.

8. To promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive rights to their respective writings and discoveries.

9. To constitute tribunals inferior to the Supreme Court.

10. To define and punish piracies and felonies committed on the high seas, and offenses against the law of nations.

11. To declare war, grant letters of marque and reprisal, and make rules concerning captures on land and water.

12. To raise and support armies, but no appropriation of money to that use shall be for a longer term than two years.

13. To provide and maintain a navy.

14. To make rules for the government and regulation of the land and naval forces.

15. To provide for calling forth the militia to execute the laws of the Union, suppress insurrections, and repel invasions.

16. To provide for organizing, arming, and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the States respectively the appointment of the officers, and the authority of training the militia according to the discipline prescribed by Congress.

17. To exercise exclusive legislation in all cases whatsoever over such district (not exceeding ten miles square) as may be, by cession of particular States and the acceptance of Congress, become the seat of Government of the United States, and to exercise like authority over all places purchased by the consent of the Legislature of the State in which the same shall be, for the erection of forts, magazines, arsenals, dry-docks, and other needful buildings.

18. To make all laws which shall be necessary and proper for carrying into execution the foregoing powers and all other powers vested by this Constitution in the Government of the United States, or in any department or officer thereof.

Section 9—(Provision as to migration or importation of certain persons. Habeas Corpus. Bills of attainder, etc. Taxes, how apportioned. No export duty. No commercial preference. Money, how drawn from treasury, etc. No titular nobility. Officers not to receive presents, etc.)

1. The migration or importation of such persons as any of the States now existing shall think proper to admit shall not be prohibited by the Congress prior to the year one thousand eight hundred and eight, but a tax or duty may be imposed on such importation, not exceeding ten dollars for each person.

2. The privilege of the writ of habeas corpus shall not be suspended, unless when in cases of rebellion or invasion the public safety may require it.

3. No bill of attainder or ex post facto law shall be passed.

4. No capitation or other direct tax shall be laid, unless in proportion to the census or enumeration hereinbefore directed to be taken.

5. No tax or duty shall be laid on

articles exported from any State.

6. No preference shall be given by any regulation of commerce or revenue to the ports of one State over those of another, nor shall vessels bound to or from one State be obliged to enter, clear, or pay duties in another.

7. No money shall be drawn from the Treasury but in consequence of appropriations made by law; and a regular statement and account of the receipts and expenditures of all public money shall be published from time to time.

8. No title of nobility shall be granted by the United States. And no person holding any office of profit or trust under them shall, without the consent of the Congress, accept of any present, emolument, office, or title of any kind whatever from any king, prince, or foreign state.

Section 10—(States prohibited from the exercise of certain powers.)

1. No State shall enter into any treaty, alliance, or confederation, grant letters of marque and reprisal, coin money, emit bills of credit, make anything but gold and silver coin a tender in payment of debts, pass any bill of attainder, ex post facto law, or law impairing the obligation of contracts, or grant any title of nobility.

2. No State shall, without the consent of the Congress, lay any impost or duties on imports or exports, except what may be absolutely necessary for executing its inspection laws, and the net produce of all duties and imposts, laid by any State on imports or exports, shall be for the use of the Treasury of the United States; and all such laws shall be subject to the revision and control of the Congress.

3. No State shall, without the consent of Congress, lay any duty of tonnage, keep troops or ships of war in time of peace, enter into agreement or compact with another State, or with a foreign power, or engage in war, unless actually invaded, or in such imminent danger as will not admit of delay.

ARTICLE II.

Section 1—(President, his term of office. Electors of President; number and how appointed. Electors to vote on same day. Qualification of President. On whom his duties devolve in case of his removal, death, etc. President's compensation. His oath of office.)

1. The executive power shall be vested in a President of the United States of America. He shall hold his office during the term of four years, and, together with the Vice-President, chosen for the same term, be elected as follows:

2. Each State shall appoint, in such manner as the Legislature thereof may direct, a number of electors equal to the whole number of Senators and Representatives to which the State may be entitled in the Congress; but no Senator or Representative or person holding an office of trust or profit under the United States shall be appointed an elector.

3. The electors shall meet in their respective States and vote by ballot for two persons, of whom one at least shall not be an inhabitant of the same State with themselves. And they shall make a list of all the persons voted for, and of the number of votes for each, which list they shall sign and certify and transmit, sealed, to the seat of the Government of the United States, directed to the President of the Senate. The President of the Senate shall, in the presence of the Senators and House of Representatives, open all the certificates, and the votes shall then be counted. The person having the greatest number of votes shall be the President, if such number be a majority of the whole number of electors appointed, and if there be more than one who have such a majority, and have an equal number of votes, then the House of Representatives shall immediately choose by ballot one of them for President; and, if no person have a majority, then from the five highest on the list of the said House shall in like manner choose the President. But in choosing the President, the vote shall be taken by States, the representation from each State having one vote. A quorum, for this purpose, shall consist of a member or members from two-thirds of the States, and a majority of all the States shall be necessary to a choice. In every case, after the choice of the President, the person having the greatest number of votes of the electors shall be the Vice-President. But if there should remain two or more who have equal vote, the Senate shall choose from them by ballot the Vice-President.*

(*This clause is superseded by Article XII., Amendments.)

4. The Congress may determine the time of choosing the electors and the day on which they shall give their votes, which day shall be the same throughout the United States.

5. No person except a natural born citizen, or a citizen of the United States at the time of the adoption of this Constitution, shall be eligible to the office of President; neither shall any person be eligible to that office who shall not have attained to the age of thirty-five years and been fourteen years a resident within the United States.

6. In case of the removal of the President from office, or of his death, resignation, or inability to discharge the

powers and duties of the said office, the same shall devolve on the Vice-President, and the Congress may by law provide for the case of removal, death, resignation, or inability, both of the President and Vice-President, declaring what officer shall then act as President, and such officer shall act accordingly until the disability be removed or a President shall be elected.

7. The President shall, at stated times, receive for his services a compensation which shall neither be increased nor diminished during the period for which he shall have been elected, and he shall not receive within that period any other emolument from the United States, or any of them.

8. Before he enters on the execution of his office he shall take the following oath or affirmation:

"I do solemnly swear (or affirm) that I will faithfully execute the office of President of the United States, and will, to the best of my ability, preserve, protect, and defend the Constitution of the United States."

Section 2—(President to be Commander-in-Chief. He may require opinions of Cabinet Officers, etc., may pardon. Treaty-making power. Nomination of certain officers. When President may fill vacancies.)

1. The President shall be Commander-in-Chief of the Army and Navy of the United States, and of the militia of the several States when called into the actual service of the United States; he may require the opinion, in writing, of the principal officer in each of the executive departments upon any subject relating to the duties of their respective offices, and he shall have power to grant reprieves and pardons for offenses against the United States except in cases of impeachment.

2. He shall have power, by and with the advice and consent of the Senate, to make treaties, provided two-thirds of the Senators present concur; and he shall nominate and by and with the advice and consent of the Senate shall appoint ambassadors, other public ministers and consuls, judges of the Supreme Court, and all other officers of the United States whose appointments are not herein otherwise provided for, and which shall be established by law, but the Congress may by law vest the appointment of such inferior officers as they think proper in the President alone, in the courts of law, or in the heads of departments.

3. The President shall have power to fill up all vacancies that may happen during the recess of the Senate by granting commissions, which shall expire at the end of their next session.

Section 3—(President shall communicate to Congress. He may convene and adjourn Congress, in case of disagreement, etc. Shall receive ambassadors, execute laws, and commission officers.)

He shall from time to time give to the Congress information of the state of the Union, and recommend to their consideration such measures as he shall judge necessary and expedient; he may, on extraordinary occasions, convene both Houses, or either of them, and in case of disagreement between them with respect to the time of adjournment, he may adjourn them to such time as he shall think proper; he shall receive ambassadors and other public ministers; he shall take care that the laws be faithfully executed, and shall commission all the officers of the United States.

Section 4—(All civil offices forfeited for certain crimes.)

The President, Vice-President, and all civil officers of the United States shall be removed from office on impeachment for and conviction of treason, bribery or other high crimes and misdemeanors.

ARTICLE III.

Section 1—(Judicial powers. Tenure. Compensation.)

The judicial power of the United States shall be vested in one Supreme Court, and in such inferior courts as the Congress may from time to time ordain and establish. The judges, both of the Supreme and inferior courts, shall hold their offices during good behavior, and shall at stated times receive for their services a compensation which shall not be diminished during their continuance in office.

Section 2—(Judicial power; to what cases it extends. Original jurisdiction of Supreme Court. Appellate. Trial by jury, etc. Trial, where.)

1. The judicial power shall extend to all cases in law and equity arising under this Constitution, the laws of the United States, and treaties made, or which shall be made, under their authority; to all cases affecting ambassadors, other public ministers and consuls; to all cases of admiralty and maritime jurisdiction; to controversies to which the United States shall be a party; to controversies between two or more States, between a State and citizens of another State, between citizens of different States, between citizens of the same State claiming lands under grants of different States, and between a State, or the citizens thereof, and foreign states, citizens, or subjects.

2. In all cases affecting ambassadors, other public ministers, and consuls, and those in which a State shall be party,

the Supreme Court shall have original jurisdiction. In all the other cases before mentioned the Supreme Court shall have appellate jurisdiction both as to law and fact, with such exceptions and under such regulations as the Congress shall make.

3. The trial of all crimes, except in cases of impeachment, shall be by jury, and such trial shall be held in the State where the said crimes shall have been committed; but when not committed within any State the trial shall be at such place or places as the Congress may by law have directed.

Section 3—(Treason defined. Proof of. Punishment of.)

1. Treason against the United States shall consist only in levying war against them, or in adhering to their enemies, giving them aid and comfort. No person shall be convicted of treason unless on the testimony of two witnesses to the same overt act, or on confession in open court.

2. The Congress shall have power to declare the punishment of treason, but no attainder of treason shall work corruption of blood or forfeiture except during the life of the person attained.

ARTICLE IV.

Section 1—(Each State to give credit to the public acts, etc., of every other State.)

Full faith and credit shall be given in each State to the public acts, records, and judicial proceedings of every other State. And the Congress may by general laws prescribe the manner in which such acts, records, and proceedings shall be proved, and the effect thereof.

Section 2—(Privileges of citizens of each State. Fugitives from justice to be delivered up. Persons held to service having escaped, to be delivered up.)

1. The citizens of each State shall be entitled to all privileges and immunities of citizens in the several States.

2. A person charged in any State with treason, felony, or other crimes, who shall flee from justice, and be found in another State, shall, on demand of the Executive authority of the State from which he fled, be delivered up, to be removed to the State having jurisdiction of the crime.

3. No person held to service or labor in one State, under the laws thereof, escaping into another shall, in consequence of any law or regulation therein, be discharged from such service or labor, but shall be delivered up on claim of the party to whom such service or labor may be due.

Section 3—(Admission of new States. Power of Congress over territory and other property.)

1. New States may be admitted by the Congress into this Union; but no new State shall be formed or erected within the jurisdiction of any other State, nor any State be formed by the junction of two or more States, or parts of States, without the consent of the Legislatures of the States concerned, as well as of the Congress.

2. The Congress shall have power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States; and nothing in this Constitution shall be so construed as to prejudice any claims of the United States, or of any particular State.

Section 4—(Republican form of government guaranteed. Each State to be protected.)

The United States shall guarantee to every State in this Union a Republican form of Government, and shall protect each of them against invasion, and, on application of the Legislature, or of the Executive (when the Legislature cannot be convened), against domestic violence.

ARTICLE V.

(Constitution: how amended. Proviso.)

The Congress, whenever two-thirds of both Houses shall deem it necessary, shall propose amendments to this Constitution, or, on the application of the Legislatures of two-thirds of the several States, shall call a convention for proposing amendments, which, in either case, shall be valid to all intents and purposes, as part of this Constitution, when ratified by the Legislatures of three-fourths of the several States, or by conventions in three-fourths thereof, as the one or the other mode of ratification may be proposed by the Congress; provided that no amendments which may be made prior to the year one thousand eight hundred and eight shall in any manner affect the first and fourth clauses in the Ninth Section of the First Article; and that no State, without its consent, shall be deprived of its equal suffrage in the Senate.

ARTICLE VI.

(Certain debts, etc., declared valid. Supremacy of Constitution, treaties, and laws of the United States. Oath to support Constitution, by whom taken. No religious test.)

1. All debts contracted and engagements entered into before the adoption of this Constitution shall be as valid against the United States under this Constitution as under the Confederation.

2. This Constitution and the laws of the United States which shall be made

in pursuance thereof and all treaties made, or which shall be made, under the authority of the United States, shall be the supreme law of the land, and the judges in every State shall be bound thereby, anything in the Constitution or laws of any State to the contrary notwithstanding.

3. The Senators and Representatives before mentioned, and the members of the several State Legislatures, and all executive and judicial officers, both of the United States and of the several States, shall be bound by oath or affirmation to support this Constitution; but no religious test shall ever be required as a qualification to any office or public trust under the United States.

ARTICLE VII.

(What ratification shall establish Constitution.)

The ratification of the Conventions of nine States shall be sufficient for the establishment of this Constitution between the States so ratifying the same.

AMENDMENTS TO THE CONSTITUTION OF THE UNITED STATES

The following amendments to the Constitution, Articles I. to X., inclusive, were proposed at the First Session of the First Congress, begun and held at the City of New York, on Wednesday March 4, 1789, and were adopted by the necessary number of States. The original proposal of the ten amendments was preceded by this preamble and resolution:

'The conventions of a number of the States, having, at the time of their adopting the Constitution, expressed a desire, in order to prevent misconstruction or abuse of its powers, that further declaratory and restrictive clauses should be added, and as extending the ground of public confidence in the Government will best insure the beneficent ends of its institution:

'*Resolved*, By the Senate and House of Representatives of the United States of America, in congress assembled, two-thirds of both Houses concurring, that the following articles be proposed to the Legislatures of the several States, as amendments to the Constitution of the United States; all or any of which articles, when ratified by three-fourths of the said Legislatures, to be valid to all intents and purposes, as part of the said Constitution, namely:'

THE TEN ORIGINAL AMENDMENTS

(They were declared in force December 15, 1791.)

ARTICLE I.

Religious Establishment Prohibited. Freedom of Speech, of the Press, and Right to Petition.

Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech or of the press; or the right of the people peaceably to assemble and to petition the Government for a redress of grievances.

ARTICLE II.

Right to Keep and Bear Arms.

A well-regulated militia being necessary to the security of a free State, the right of the people to keep and bear arms shall not be infringed.

ARTICLE III.

No Soldier to be Quartered in Any House, Unless, Etc.

No soldier shall, in time of peace, be quartered in any house without the consent of the owner, nor in time of war but in a manner to be prescribed by law.

ARTICLE IV.

Right of Search and Seizure Regulated.

The right of the people to be secure in their persons, houses, papers, and effects against unreasonable searches and seizures, shall not be violated, and no warrants shall issue but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

ARTICLE V.

Provisions Concerning Prosecution, Trial and Punishment.—Private Property Not to Be Taken for Public Use, Without Compensation.

No person shall be held to answer for a capital or other infamous crime unless on a presentment or indictment of a Grand Jury, except in cases arising in the land or naval forces, or in the militia, when in actual service, in time of war or public danger; nor shall any person be subject for the same offense to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use without just compensation.

ARTICLE VI.

Right to Speedy Trial, Witnesses, Etc.

In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed, which districts shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the assistance of counsel for his defense.

ARTICLE VII.

Right of Trial by Jury.

In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury shall be otherwise re-examined in any court of the United States than according to the rules of the common law.

ARTICLE VIII.

Excessive Bail or Fines and Cruel Punishments Prohibited

Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

ARTICLE IX.

Rules of Construction of Constitution

The enumeration in the Constitution of certain rights shall not be construed to deny or disparage others retained by the people.

ARTICLE X.

Rights of States Under Constitution.

The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.

The following amendment was proposed to the Legislatures of the several States by the Third Congress on the 5th of March, 1794, and was declared to have been ratified in a message from the President to Congress, dated Jan. 8, 1798.

ARTICLE XI.

Judicial Powers Construed.

The judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States, by citizens of another State, or by citizens or subjects of any foreign state.

The following amendment was proposed to the Legislatures of the several States by the Eighth Congress on the 12th of December, 1803, and was declared to have been ratified in a proclamation by the Secretary of State, dated September 25, 1804. It was ratified by all the States except Connecticut, Delaware, Massachusetts, and New Hampshire.

ARTICLE XII.

Manner of Choosing President and Vice-President.

The Electors shall meet in their respective States, and vote by ballot for President and Vice-President, one of whom at least shall not be an inhabitant of the same State with themselves; they shall name in their ballots the person voted for as President, and in distinct ballots the person voted for as Vice-President; and they shall make distinct lists of all persons voted for as President, and of all persons voted for as Vice-President, and of the number of votes for each, which list they shall sign and certify, and transmit, sealed, to the seat of the Government of the United States, directed to the President of the Senate; the President of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates and the votes shall then be counted; the person having the greatest number of votes for President shall be the President, if such number be a majority of the whole number of Electors appointed; and if no person have such majority, then from the persons having the highest number, not exceeding three, on the list of those voted for as President, the House of Representatives shall choose immediately, by ballot, the President. But in choosing the President, the votes shall be taken by States, the representation from each State having one vote; a quorum for this purpose shall consist of a member or members from two-thirds of the States, and a majority of all the States shall be necessary to a choice. And if the House of Representatives shall not choose a President, whenever the right of choice shall devolve upon them, before the fourth day of March next following, then the Vice-President shall act as President, as in the case of the death or other constitutional disability of the President. The person having the greatest number of votes as Vice-President shall be the Vice-President if such number be a majority of the whole number of Electors appointed, and if no person have a majority, then from the two highest numbers on the list the Senate shall choose the Vice-President; a quorum for the purpose shall consist of two-thirds of the whole number of Senators, and a majority of the whole number shall be necessary to a choice. But no person constitutionally ineligible to the office of President shall be eligible to that of Vice-President of the United States.

The following amendment was proposed to the Legislatures of the several States by the Thirty-eighth Congress on the 1st of February, 1865, and was declared to have been ratified in a proclamation by the Secretary of State dated December 18, 1865. It was rejected by Delaware and Kentucky; was constitutionally ratified by Alabama and Mississippi; and Texas took no action.

ARTICLE XIII.

Slavery Abolished.

1. Neither slavery nor involuntary

servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall exist within the United States, or any place subject to their jurisdiction.

2. Congress shall have power to enforce this article by appropriate legislation.

The following, popularly known as the Reconstruction Amendment, was proposed to the Legislatures of the several States by the Thirty-ninth Congress on the 16th of June, 1866, and was declared to have been ratified in a proclamation by the Secretary of State, dated July 28, 1868. The amendment got the support of 23 Northern States; it was rejected by Delaware, Kentucky, Maryland, and 10 Southern States. California took no action. Subsequently it was ratified by the 10 Southern States.

ARTICLE XIV.

Citizenship Rights Not to be Abridged.

1. All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the State wherein they reside. No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property without due process of law, nor deny to any person within its jurisdiction the equal protection of the laws.

Apportionment of Representatives in Congress.

2. Representatives shall be apportioned among the several States according to their respective numbers, counting the whole number of persons in each State, excluding Indians not taxed. But when the right to vote at any election for the choice of Electors for President and Vice-President of the United States, Representatives in Congress, the executive and judicial officers of a State, or the members of the Legislature thereof, is denied to any of the male members of such State, being of twenty-one years of age, and citizens of the United States, or in any way abridged, except for participation in rebellion or other crime, the basis of representation therein shall be reduced in the proportion which the number of such male citizens shall bear to the whole number of male citizens twenty-one years of age in such State.

Power of Congress to Remove Disabilities of United States Officials for Rebellion.

3. No person shall be a Senator or Representative in Congress, or Elector of President and Vice-President or holding any office, civil or military, under the United States, or under any State, who, having previously taken an oath, as a member of Congress, or as an officer of the United States, or as a member of any State Legislature or as an executive or judicial officer of any State, to support the Constitution of the United States, shall have engaged in insurrection or rebellion against the same, or given aid and comfort to the enemies thereof. But Congress may, by a vote of two-thirds of each House, remove such disability.

What Public Debts Are Valid.

4. The validity of the public debt of the United States, authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection and rebellion, shall not be questioned. But neither the United States nor any State shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any claim for the loss or emancipation of any slave; but all such debts, obligations, and claims shall be held illegal and void.

5. The Congress shall have power to enforce by appropriate legislation the provisions of this article.

The following amendment was proposed to the Legislatures of the several States by the Fortieth Congress on the 27th of February, 1869, and was declared to have been ratified in a proclamation by the Secretary of State, dated March 30, 1870. It was not acted on by Tennessee; it was rejected by California, Delaware, Kentucky, Maryland, and Oregon; ratified by the remaining 30 States. New York rescinded its ratification January 5, 1870. New Jersey rejected it in 1870, but ratified it in 1871.

ARTICLE XV.

Equal Rights for White and Colored Citizens.

1. The right of the citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of race, color, or previous condition of servitude.

2. The Congress shall have power to enforce the provisions of this article by appropriate legislation.

The following amendment was proposed to the Legislatures of the several States by the Sixty-first Congress on the 12th day of July, 1909, and was declared to have been ratified in a proclamation by the Secretary of State, dated February 25, 1913. The income tax amendment was ratified by all the States, except Connecticut, Florida, Pennsylvania, Rhode Island, Utah, and Virginia.

ARTICLE XVI.

Income Tax Authorized.

The Congress shall have power to lay and collect taxes on incomes, from whatever sources derived, without apportionment among the several States, and without regard to any census or enumeration.

The following amendment was proposed to the Legislatures of the several States by the Sixty-second Congress on the 16th day of May, 1912, and was declared to have been ratified in a proclamation by the Secretary of State, dated May 31, 1913. It got the vote of all the States except Alabama, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Rhode Island, South Carolina, Utah, and Virginia.

ARTICLE XVII.

United States Senators to Be Elected by Direct Popular Vote.

1. The Senate of the United States shall be composed of two Senators from each State, elected by the people thereof, for six years; and each Senator shall have one vote. The electors in each State shall have the qualifications requisite for electors of the most numerous branch of the State Legislatures.

Vacancies in Senatorships, When Governor May Fill by Appointment.

2. When vacancies happen in the representation of any State in the Senate, the executive authority of such State shall issue writs of election to fill such vacancies: Provided, That the Legislature of any State may empower the Executive thereof to make temporary appointment until the people fill the vacancies by election as the Legislature may direct.

3. This amendment shall not be so construed as to affect the election or term of any Senator chosen before it becomes valid as part of the Constitution.

ARTICLE XVIII.

Liquor Prohibition Amendment.

1. After one year from the ratification of this article the manufacture, sale, or transportation of intoxicating liquors within, the importation thereof into, or the exportation thereof from the United States and all territory subject to the jurisdiction thereof for beverage purposes is hereby prohibited.

2. The Congress and the several States shall have concurrent power to enforce this article by appropriate legislation.

3. This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution by the Legislatures of the several States, as provided in the Constitution, within seven years from the date of the submission hereof to the States by the Congress.

ARTICLE XIX.

Giving Nation-Wide Suffrage to Women.

1. The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of sex.

2. Congress shall have power, by appropriate legislation, to enforce the provisions of this article.

CONSTITUTIONAL CONVENTIONS, an institution of political democracy originating in the American colonies during the Revolutionary War. It may be divided into three phases; first, the framing of a constitution by a regular legislative body, with the authorization of the people, but without being subjected to their approval; second, the framing of a constitution by a special body, especially elected for that purpose by the people, without afterwards being subjected to their ratification; third, being framed by the specially elected body and ratified by the people through a referendum. The last phase may now be said to have been established as the approved method in this country, and in all countries with any pretentions to democratic government. The constitutions of several states were at first framed by the first method, without reference to popular vote, these states including North Carolina, South Carolina, Georgia, Virginia, New Jersey, Massachusetts and Rhode Island. Massachusetts was the first state to seek ratification of a state constitution, which was done through a referendum vote, in 1778.

CONSUBSTANTIATION, doctrine promulgated by Martin Luther, that the body and blood of Christ are present with the substance of the bread and wine in Holy Communion; opposed to transubstantiation.

CONSUL.—(1) Title of two chief magistrates of Rom. republic. The office was established at fall of the monarchy; power of monarch remained to consuls, but was limited by their only holding office for one year, their responsibility to people at end of office, and the fact that one C. could nullify acts of his partner. They had command of army, control of foreign affairs, appointment of treasurers. Dates were given by naming the C's of the time. Twelve lictors carried before them *fasces* and axe, symbols of supreme judicial power. With aristocratic constitution of early republic, C's, who were chosen by retiring C's and confirmed by people, were always patricians. *Lex Licinia* (367 B. C.) ordained that one C. should always be plebian. Enactments granting right of appeal from decisions of C's, codification of laws, establishment of tribunate of *plebs*, *censors*, *praetor*, and *curule aediles* marked gradual transition of Rom. constitution from oligarchy to democracy. In crises they either received extraordinary powers or were superseded by a *dictator*. Retired C's governed provinces as *pro-consuls*. Under Empire their election was transferred first to senate, then to emperor; their numbers were increased; their powers lost. Napoleon revived title, being called First Consul till his coronation, 1804.

(2) Representative of a state in a foreign country to protect trade of its subjects, collect commercial information, and carry out further printed instructions. This use of word C. originated in mediæval trading cities of Italy, which commenced to send C's far afield at close of XI. cent.; the system was speedily imitated, and became universal in XVI. cent.; organized in XIX. cent.

CONSUMPTION, term popularly used for the process of destruction of the tissue of the lung due to tuberculosis; in political economy, that part of the subject dealing with the use of wealth as opposed to production or the making of wealth. See TUBERCULOSIS.

'CONSULATE OF THE SEA' (or *Book of the Consulate*), Catalan treatise on maritime customs, first pub. in XV. cent.

CONSUS (classical myth.), Rom. agricultural deity.

CONTAGION, term designating communication of disease from one person to another, as the result of direct contact with diseased person, or with clothes, papers, or 'carriers'—(*i.e.*) persons who transmit disease without suffering from it themselves. A distinction is sometimes made between contagious and infectious diseases, but the difference is merely one of degree, and the distinction has no scientific basis. Typical contagious diseases are Spanish influenza, diphtheria, measles, scarlet fever, typhus fever, small pox, and bubonic plague. See QUARANTINE.

CONTARINI, Venetians, who through several cent's. were distinguished for public service, several holding office of Doge.

CONTÉ, NICOLAS JACQUES (1755-1805), Fr. painter and inventor; introduced military balloons; invented pencils of mixture of graphite and clay, barometer, and many other contrivances.

CONTEMPT OF COURT, is an insult to a Court of Justice, or any defiance or resistance to its authority. If the attempt be committed in the face of the Court, the offender may be instantly apprehended and imprisoned at the discretion of the judges, without any further proof or examination. Doing anything calculated to prejudice a fair trial of any case, or the disobedience of a judicial order, or the interference with the due course of justice, amounts to contempt of court. Commenting in a newspaper on the facts of a case which is proceeding at the time, especially if it be in any way calculated to influence the jury, and writing letters about such a case to the judge and jury who are trying it, are instances of gross contempt of court.

CONTI, NICOLO DE' (early XV. cent.), Venetian traveler; explored India, Malay Archipelago, etc.; returned by 'Ciampa,' possibly Indo-China, Aden, Jidda, and Cairo; arrived at Venice, 1444; gave valuable account of S. Asia.

CONTI, PRINCES OF.—Fr. title taken from estate of Condé family at Conti-sur-Selles; held by many distinguished members of family of Condé. François, 1558-1614, 1st marquis and prince, supported League against Guises; Armand de Bourbon, 1629-66, general and writer, bro. of great general, Condé, was leader of Fronde, but became reconciled to Mazarin.

CONTINENT, term in physical geog. for each of the larger continuous masses of land on earth's surface; recognized in modern geog. as six—Eurasia, Africa, N. and S. America, Australia, and Antarctica; formerly reckoned as two, the Old and New; the former comprising Eurasia and Africa, the latter N. and S. America.

CONTINENTAL SHELF, submarine plain, not more than 600 ft. below sea-level, surrounding most continents, especially of the N. hemisphere; narrow round the S. continents except between Tasmania, Australia, and New Guinea, and between S. America and the Falkland Islands. The steep descent from the c. s. to the ocean depths is termed the continental slope.

CONTINENTAL SYSTEM. See BERLIN, ACTS OF.

CONTOUR LINE, on maps, line where (horizontal) plane at a certain elevation intersects surface of the land.

CONTINUITY, a principle by which it is assumed that appreciable changes in progressive phenomena correspond to inappreciable changes taking place in inappreciable intervals. In psychology the principle involves the idea of a stream of consciousness; that no state of consciousness is fixed, but is arriving out of a previous state and already developing into a subsequent state. In graphical mathematics, a function is said to be continuous at a point if it is defined in an interval containing that point and has a limit at the point which is equal to the function of the point. The function is said to be continuous throughout an interval when it is continuous at every point of the interval. In hydrodynamics, the principle of C. assumes that a fluid is absolutely homogeneous and devoid of viscosity; this leads to relationships which are only approximately true in the more practical science of hydraulics.

CONTRABAND OF WAR, goods the importation of which is interdicted to a belligerent either by international law or by special proclamation of the other belligerent. What is contraband depends to some extent on circumstances, but always includes arms, ammunition, and munitions generally. Formerly articles were divided into 'absolute' and 'conditional' contraband, the latter being held to include foodstuffs. The 'doctrine of contraband by destination' deals with articles of ambiguous purpose. During the World War the old rules were in abeyance, and Britain prohibited the importation of food, coal, and raw material into Germany and into neutral countries that might supply her, in the latter case in excess of normal consumption. See Blockade; also Declaration of London.

CONTRACT, an agreement entered into between two or more persons sanctioned by law, by which agreement each undertakes to do, or to abstain from doing, a specified act or acts, in consideration of the other or others doing, or abstaining from doing, some other act or acts. It is true that every c. is an agreement, but not every agreement is a c. The law demands before an agreement becomes an enforceable c. that certain requirements shall be fulfilled, such as the legal capacity of the parties, the legality of the object aimed at, and, in some cases, the way in which the c. is evidenced. C's may be divided into three classes: (1) c's by matter of record; (2) c's under seal, which are sometimes spoken of as *specialties*; and (3) c's not under seal, which are called *simple*, or *parole*, c's. (1) are those founded on the authority of a court of record; (2) those made by deed—generally speaking, they require no consideration to support them; (3) those made simply in writing, or by word of mouth.

CONTRACTILE VACUOLE, in one-celled organisms, spherical cavity with liquid or minute radiating canals, periodically formed and discharged; acts like kidneys as conveyor of waste matter in metabolism of Protozoa.

CONTRADICTION, PRINCIPLE OF, one of laws of thought regulating all valid reasoning; that the same attribute cannot be at the same time affirmed and denied of the same subject (Aristotle).

CONTRAFAGOTTO, DOUBLE BASSOON, wood-wind instrument of the double reed order, the use of which dates back to very early times.

CONTRALTO, the lowest or deepest musical voice among boys and women.

CONTREXÉVILLE (48° 9′ N., 5° 51′ E.), village, Vosges, France; mineral springs; health resort.

CONTROL OF BIRTH. See Birth Control.

CONVENT, society of persons living a religious life in a monastery or nunnery.

CONVENTION, military term signifying temporary truce, as C. of Cintra, 1008; also used for custom which has grown out of practice and experience of society; the C. Parliament was assemblage of M.P.'s after James II.'s flight, 1688.

CONVENTION, CONSTITUTIONAL. See Constitutional Convention.

CONVENTION, THE NATIONAL, Fr. assembly, 1792-95, for drawing up republican constitution; elected by suffrage of all self-supporting Frenchmen of legal age; app. fresh pres. every fortnight; gradually assumed executive powers; had famous committees of Public Safety, General Security, Education, etc., which reorganized army and internal administration.

CONVERSANO (40° 58′ N., 17° 7′ E.), town, Apulia, Italy; bp.'s see; cathedral (XI. cent.). Pop. 14,000.

CONVERSE, FLORENCE (1871), writer, *b.* New Orleans, La. Graduating from Wellesley College in 1893, she became an editorial attache of The Churchman, and later joined the Atlantic Monthly, which published a number of short stories and poems from her pen. Her books include novels, among them *A Mask of Sybils*, 1910; and *The Children of Light*, 1912; a Christmas Miracle Play.

The Blessed Birthday, 1917; and a history of Wellesley College. She also edited the Little Schoolmate Series.

CONVERSE, FREDERICK SHEPHERD (1871), composer, *b.* Newton, Mass. He received his musical training at the Royal School of Music, Munich, after graduating from Harvard. He taught harmony at the New England Conservatory of Music, Boston, from 1899 to 1901, when he became instructor and assistant professor of Music at Harvard until 1907. He acquired note as a composer of songs, pianoforte pieces, operas and symphonic poems. His better known works include an oratorio, *Job*; an orchestral fantasy, *The Mystic Trumpeter*, four operas, *The Pipe of Desire*, *The Sacrifice*, *Beauty and the Beast* and *The Immigrants*; and a cantata, *The Peace Pipe*.

CONVERSION, term used in theol., logic, and law. Under the first heading it refers to the acceptance of Christianity by a heathen mind, or the change from one faith to another; under the second, the act of interchanging the terms of a proposition; under the third, the unauthorized transference of another's property into a different medium.

CONVERTER, BESSEMER. See Bessemer Converter.

CONVEX, term for exterior of curved surface, opposed to *concave*.

CONVEYANCING, legal term employed in the transfer of real property by means of written instruments.

CONVEYORS, appliances for the transmission of grain, coal, or other material in a horizontal direction or at an angle of not more than 20° with the horizon. Where large quantities are to be dealt with, and the distances to be covered are comparatively long, the *band* or *belt* conveyor is highly efficient. This type consists of an endless rubber or canvas band, from two to five plies thick, running over top and bottom rollers at suitable distances apart. Support is given to the sides of the band in such a way as to convert it into a kind of shallow trough, in which the material to be transported lies. For conveying grain in granaries a speed of from 400 to 800 ft. per minute is developed; above this maximum, some times even below it, the action of the air blows the material off the belt. The grain or other material may be delivered at any desired point by means of a throw-off carriage or tripper. This appliance consists of a traveling frame with un upper and a lower transverse roller. The belt rises gradually about 18 in., passes over the top roller, and is then sharply depressed, and travels round the bottom roller, forming an S curve. The grain, on coming to the top roller, is shot forward into a hopper or chute, which deposits it at one side or the other, while the belt continues its course. For hot or heavy material (*e.g.*), coal, coke, furnace ashes, etc., the conveyor belt is generally made of steel plates linked together. *Bucket conveyors* are modifications of band conveyors, and consist essentially of a number of buckets fixed at regular intervals upon an endless chain. They may be used both as conveyors and as elevators for such materials as grain and coal, and they are particularly suitable for work on dredges.

The *worm* or *spiral conveyor* is one of the oldest and simplest types. It consists merely of a steel spiral fitted into a strong trough and driven by suitable gearing. The material is fed in at one end, and, as the spiral revolves, is slowly pushed along the trough. Delivery is effected through a door in the floor of the trough. Almost all dry substances can be transported by this type of conveyor, which is preferable to the belt type for small quantities which are to be carried over short distances.

The *rope-way* or *cable-way* is an even simpler type, and is specially well adapted for cases in which it is impossible to fix regular and frequent supports (*e.g.*), in crossing rivers or ravines. A strong steel cable suspended from towers or A frames forms a track along which a load carriage is operated to and fro by some system of mechanical haulage.

CONVOCATION (Lat. *convocatio*, calling together). (1) Act of summoning assembly, or assembly so summoned. (2) Name of provincial synods in Church of England, which sit contemporaneously with Parliament, being summoned by respective abp's by virtue of royal writ; composed of upper house of bp's and lower house of deans, archdeacons, and representatives of cathedral chapters, provost of Eton, two proctors elected by beneficed clergy from each diocese of southern province, and two proctors elected by archdeacon from each see in province of York; origin is obscure; important in history of Eng. constitution as opponent to tyranny of crown; refused under Edward I. to assemble unless summoned through abp., or to pay 'aids' not granted by c.; clergy in XIV. cent. refused to attend Parliament instead of c.; often summoned c. without royal writ; Henry VIII. obtained 'Act of Submission' putting an end to independent legislation of c.; used to reform

Church in XVI. and XVII. cent.'s; separate taxing abolished, 1665; XVIII.-cent. period of faction, prorogation 1741-1852, reform 1852 onwards.

CONVOLVULUS, the typical genus of the order Convolvulaceæ, and consists of about 170 herbaceous and shrubby plants growing in temperate and subtropical climates. Many of these are twining plants with large, white, trumpet-shaped flowers, and contain a milky latex. *C. arvensis* is the common bindweed found in Britain; it grows in a sandy soil, and the flowers have a sweet fragrance. *C. Scammonia*, a native of the Levant, has a rhizome which yields a resinous juice from which the purgative drug known as scammony is obtained. In the United States the plants are known as morning-glory, and in Britain the large C., which brightens our hedges, belongs to an allied genus and is technically termed *Calystegia sepium*.

CONVOY (Late Lat. *conviare*, accompany), in the navy, the name given to one or more ships of war sent to protect a merchant fleet from the attacks of a national enemy or from pirates. This name came into use about the 17th cent. and was usually applied to the vessels thus escorted. The term was applied in the World War to the protection vessels which escorted troop and supply ships through the zones of danger. In military service the C. is strictly a train of wagons stocked with provisions or supplies for war. The term is also used for a detachment of troops or escort appointed to protect such a train or sometimes people.

CONVULSIONS, violent and spasmodic contractions of the body, either continuous or alternating with relaxations, symptomatic of epilepsy, uræmia and other diseases, or in infants due to nervous irritation from teething, gastrointestinal troubles, rickets, etc. During the c. a few inhalations of chloroform are often given, or the infant is plunged into a hot bath, or an emetic is administered if caused by overloading the stomach, and the cause is treated on general principles.

CONWAY (53° 17′ N., 3° 50′ W.), market town and seaport, on estuary of Conway, Carnarvonshire, Wales; surrounded by high walls with battlements and towers; river crossed by fine bridges; C. castle (built by Edward I., 1284), is famous ruin. Pop. 5,000.

CONWAY HENRY SEYMOUR (1721-95), Eng. general and statesman; opposed North's Amer. policy and brought about his resignation; field marshal, 1793.

CONWAY, HUGH (1847-85), Eng. novelist; *nom de plume* of F. J. Fargus, author of *Called Back*, 1883; and other successful novels.

CONWAY, MONCURE DANIEL (1832-1907), Amer. preacher, lecturer, and man of letters; for over twenty years pastor of the Ethical Society at South Place, London. Wrote *Life of Thomas Paine*, 1892; and edited his works (4 vols. 1894-6).

CONWAY, PATRICK (1867), Received his education at Homer, N.Y., Academy and Ithaca Conservatory of Music. Instructor of the Cornell University Cadet Band from 1895-1908. Organized Conway's Band in 1908 and later became its leader. Played for twelve seasons at Willow Grove Park, Steel Pier, Atlantic City and the San Francisco Exposition in 1915 besides many state fairs and other important engagements. In 1918 was camp band instructor at Camp Arthur, Texas.

CONWAY, SIR WILLIAM MARTIN (1856), Eng. mountaineer and historian of art, prof. of art at Univ. College, Liverpool (1885-8), and Slade prof. of fine art at Cambridge (1901-4); his works on art include *Early Fleming Artists*, *The Domain of Art*, *Early Tuscan Artists*, etc. On his travels he has written *Climbing and Exploration in the Karakoram-Himalayas*, *The Alps from End to End*, *The First Crossing of Spitzbergen*, *Mountain Memories*, etc.; also *The Crows in Peace and War*, *The Abbey of St. Denis*, etc. Represented Eng. universities in Parliament from 1918.

CONWELL, RUSSELL HERMAN (1842), Baptist minister, lecturer and author, *b.* Worthington, Mass. He studied law at Yale, leaving there to join the Union forces on the outbreak of the Civil War, in which he rose to the rank of lieutenant colonel. After the war he practised law in Minnesota, then went to Germany, where he acted as foreign correspondent for the New York Tribune and the Boston Traveler. He returned to the United States in 1870 and resumed the practice of law in Boston till 1879, meantime preparing for admission into the Baptist ministry, to which he was ordained in the latter year. In 1881 he was appointed pastor of the Grace Baptist Church in Philadelphia, with which city his activities henceforth became identified. There he founded the Temple University, whose presidency he occupied from 1888. From 1891 dated his noted pastorate of the Baptist Temple in the same city. He acquired national note as a lecturer and as the author of a number of miscellaneous works. He wrote biographies of *Bayard Taylor*, *C. H. Spurgeon*, and *James G. Blaine*, as well as *Lives of the Presidents*.

In 1923 he received the Edward Bok prize of $10,000, known as the Philadelphia Award, established in 1921 for bestowal upon the man or woman in Philadelphia who has contributed services that were of signal help to that city's civic and social welfare.

CONYBEARE, WILLIAM DANIEL (1787-1857), Eng. geologist; grandson of John C., bp. of Bristol; first to describe *Plesiosaurus*, discovered by Mary Anning; pub. numerous research memoirs and *Outlines of the Geology of England and Wales*; F.R.S.

COODE, SIR JOHN (1816-92), Eng. engineer; superintended construction of Portland and Colombo harbors; member of Suez Canal of Commission, 1889-91; pres. of the Institution of Civil Engineers.

COOK, ALBERT STANBURROUGH (1853), Amer. scholar; prof. of Eng. Language and Lit., Yale.

COOK, EDWARD DUTTON (1829-83), Eng. dramatic critic and novelist.

COOK, ELIZA (1818-89), Eng. popular poet.

COOK ISLANDS, HERVEY ISLANDS (20° 45′ S., 159° W.), group in Pacific Ocean, S.W. of Society Islands; principal islands are Rarotonga, Mangaia, Aitutaki, Atiu; dependency of New Zealand; discovered by Capt. Cook, 1777; chief products, coffee, fruits, cocoa-nuts. Pop. 1921, 13,209.

COOK, FRANCIS AUGUSTUS (1843-1916), naval officer, *b.* Northampton, Mass. He served as an ensign under Farragut in the West Gulf, blockading squadron for two years after graduating from Annapolis in 1863. By 1880 he was a commander and took charge of the department of seamanship at Annapolis for three years. Later he served four years as inspector of ordnance at the Brooklyn Navy Yard. He became captain in 1896, taking command of the cruiser Brooklyn. The outbreak of the war with Spain in 1898 found him and his cruiser with Captain Schley's flying squadron, which figured prominently in the destruction of the Spanish admiral's fleet at Santiago, Cuba. The Brooklyn pursued and overtook the Cristobal Colon, which ran ashore at Tarquino, where her commander surrendered to Captain Cook. He joined the U.S. Naval Examining Board after the war and retired in 1903.

COOK, FREDERICK ALBERT (1865), (family name changed from Koch to Cook). Graduated from the University Medical College of New York University in 1891. He was surgeon of the Peary Arctic Expedition in 1901-2 and was also surgeon of the Belgian Antarctic Expedition in 1897-9. Claimed to have made the ascent of Mt. McKinley, in 1906, and, returning from a trip in the Arctic regions claimed to have reached the North Pole on April 21, 1908. He was received with great honors in Denmark and lectured extensively in the United States and England in 1913 and 1914 but scientists of Copenhagen later declared that the data he submitted was insufficient. Author of *Through the First Antarctic Night*, 1900; *To the Top of the Continent*, 1907; and *My Attainment of the Pole*, in 1909; also wrote several magazine articles.

COOK, GEORGE CRAM (1873). Graduated from the University of Iowa in 1892; A.B. Harvard, 1893; Heidelberg, 1894 and the University of Geneva in 1895. Taught in University of Iowa from 1895-9 and Leland Stamford, Jr., University from 1902-3. Was associate literary editor of the Chicago Evening Post, 1911. Author of *In Hampton Roads*, 1899; *Roderick Taliaferro, A Story of Maximilian's Empire*, 1903; *Evolution and the Superman*, 1906; *The Chasm*, 1911; *Battle Hymn of the Workers*, 1912; *The C. T. U.*, 1914; *Suppressed Desires*, 1920; and two plays: *Tickless Time*, produced in book form, 1920 and *The Spring*, produced in book form in 1921.

COOK, JAMES (1728-79), Eng. navigator; apprenticed to shipowners of Whitby; entered navy, 1755; lieut. of Endeavor, which sailed for S. Pacific, 1768; explored coasts of New Zealand and Eastern Australia, of which he took possession in name of Britain, naming New South Wales; returned by Cape of Good Hope; sent out as commander of Resolution, 1772; marvelous voyage of discovery, in which old idea of southern continent was destroyed, and anti-scorbutic precautions prevented usual heavy death-roll of expedition; slain on last voyage (1776-79).

COOK, THOMAS (1808-92), Eng. excursion agent; commenced, 1841; extended excursions over Europe by 1865; U.S.A. and Palestine, 1869; Egypt and Sudan later. *s.* John Mason became partner, and grandsons now carry on business.

COOKE, EDMUND VANCE (1866). Received his education from Cleveland public schools. Platform lecturer with lecture entertainments. Author of:

A Patch of Pansies, 1894; *Rimes to Be Read*, 1897-1905; *Impertinent Poems*, 1903-7; *Chronicles of the Little Tot*, 1905; *Told to the Little Tot*, 1906; *Morning's Mail*, 1907; *Little Songs for Two*, 1909; *Basebology*, 1911; *The Story Club*, 1912; *The Uncommon Commoner*, 1913; *Just Then Something Happened*, 1914, and the Cooke Book (for schools) in two volumes, 1922. Contributed poems, stories and occasional articles to leading magazines and weeklies. Staff Poet of the Newspaper Enterprise Association, contributing daily poems to several hundred newspapers, 1918-20.

COOKE, GEORGE FREDERICK (1756-1811), Eng. Shakespearean actor; rival of Kemble.

COOKE, GRACE MACGOWAN (1863), novelist, *b.* Grand Rapids, Ohio. She married William Cooke in 1877. From 1888 she became known as a contributor to magazines. Several of her books were written in collaboration with others. Those of her works of which she was sole author include *The Power and the Glory*, *The Doings of the Dollivers*, and *The Joy Bringer*.

COOKE, JAY (1821-1905), banker and financier, *b.* Sandusky, Ohio. As a boy he became a clerk in a Sandusky store and at fifteen joined the banking house of E. W. Clarke & Co., at Philadelphia, where he displayed such marked ability in grasping the complexities of finance that he was admitted into the firm as a junior partner when he was twenty-one. Upon his retirement from the firm in 1858 he engaged in a general banking business, mainly in financing railroad companies and negotiating their bond issues. In 1861 he established the firm of Jay Cooke & Co. of Philadelphia in association with his brother-in-law. The firm was the chief fiscal agent of the federal government during the Civil War, floating government bond issues aggregating $2,500,000,000. After the war the firm financed the Northern Pacific Railway Company, but advanced the road too much money on its bonds, with the result that the house failed and precipitated the financial panic of 1873. Later the bonds greatly appreciated in value and the Cooke house recovered its stability and resources, paying its creditors both the principal and interest of their claims. He was a strong advocate of the national banking system that became established in the war period.

COOKE, JOHN ESTEN (1830-1886), novelist, *b.* Winchester, Va. He was the son of John Rogers Cooke, a noted jurist, and brother of Philip Pendleton Cooke, the poet. He made the Civil War his literary field in his numerous novels and military biographies, and was well equipped by the task as a Confederate officer on Stonewall Jackson's and Gen. J. E. B. Stuart's staffs, and as inspector general of horse artillery of the Army of Northern Virginia. Among his war stories *Surry of Eagle's Nest*, 1866, was the most popular. His biographies included lives of Jackson and Lee. He also wrote a history of Virginia for the American Commonwealth Series.

COOKE, ROSE TERRY (1827-1892), poet and short story writer, *b.* West Hartford, Conn. Her themes chiefly related to New England rural life. Most of her work took the form of short fiction, much of which first appeared in the magazines and afterwards in volume form. She married R. H. Cooke in 1873. She was the author of a single novel *Steadfast*, published in 1889.

COOKERY, the preparation of food by heat, is said to date from Neolithic times. Before fire was known, the only way of dressing meat was by exposing it to the sun; but after its discovery fire was first used for drying and afterwards for cooking flesh. The chief disadvantage of this primitive method was that those parts of the meat which came in direct contact with the fuel were blackened and besmirched, and to obviate this, spits were passed through it and it was raised to a height above the fire—the method of grilling or broiling, the chief mode known to the ancient Greeks of the Homeric epoch, being thus invented.

The Greeks gave considerable attention to gastronomic pleasures, and Athenian travelers were constantly introducing new dishes, and improved methods of cooking, from other lands. Their system of cooking and dressing food was in turn copied by the Romans. The era of modern cooking dates back to the period of the Ital. Renaissance. Ital. methods were introduced into France by Catherine de' Medici, who brought cooks from her own country. Under Louis XIV. and Louis XV. cooking became an art. Fr. methods soon found their way into England, and cookery began to appear as early as the first half of the XVI. cent.

In roasting, whereby the nutritive qualities are best preserved, the meat is exposed to the direct influence of the fire by placing it before an open grate, basting it frequently, and keeping it in motion to prevent scorching of any part. Owing to the now general disuse of open grates, roasting is now practically superseded by baking, (*i.e.*) cooking in the oven, the chief difference from roasting being that the fumes are not carried off.

Boiling is cooking by means of hot

water, which, according to Liebig, should be boiling before the meat is immersed. Stewing is simmering in a small quantity of water in a closed vessel, and requires less heat than boiling. Broiling or Grilling is cooking on a gridiron directly over a bright clear fire, and resembles roasting in effect. Frying is cooking in boiling fat; there are two methods, *saute* or dry frying in a shallow pan with a small quantity of fat, and deep frying in a large quantity. Steaming is carried out by placing meat in a double cooker or in a jar placed in a saucepan of boiling water. Braising is stewing meat slowly with vegetables in a covered pan.

COOKING. See COOKERY.

COOKTOWN (15° 27′ S., 145° 25′ E.), seaport, on Endeavour, Queensland, Australia; gold in tin mining in district.

COOKWORTHY, WILLIAM (1705-80), Eng. potter; discoverer of Eng. China clay.

COOLEY, ANNA MARIA (1874). Graduated from New York Normal College, 1893, and took a course in Jenny Hunter Kindergarten Training School, New York, in 1894. She studied at Barnard College, 1896, and received B.S. from Teachers College (Columbia) and Bachelors diploma for teaching domestic art, 1903. She was principal of domestic art and domestic science at the Hackley Manual Training School, Muskegon, Mich., 1904, was also instructor of the summer sessions from 1905-7 at the University of Tennessee. She became associate professor at Teachers College, Columbia University, in 1917. Author of *Occupations for Little Fingers*, 1905; *Domestic Art in Woman's Education*, 1910; *Teaching Home Economics*, and wrote text-books for rural communities in three volumes. Was also a contributor to the Household Arts Review, Home Economics Journal and others.

COOLEY, THOMAS MCINTYRE (1824-1898), jurist and authority on constitutional law; *b.* Attica, N. Y. In his youth he removed to Michigan, where he studied law and was admitted to the bar in 1846, beginning a legal career in that state which culminated in his appintment as Chief Justice of the State Supreme Court in 1868. He compiled the general statutes of the State, was reporter for the Supreme Court and published eight volumes of reports and a digest of the Michigan decisions. He also held important posts at the University of Michigan, serving as professor in the law department, professor of constitutional and administrative law in the school of political economy, and also as professor of American history. He became a judge of the State Supreme Court in 1864, acting till 1885. His tenure of the Chief Justiceship was from 1868 to 1869. He wrote authoritative commentaries on constitutional law and on taxation and torts. He also contributed a history of Michigan to the American Commonwealth Series.

COOLGARDIE (30° 57′ S., 121° 10′ E.), town, W. Australia; gold-fields are among richest in colony. Pop. 4,000.

COOLIDGE, ARCHIBALD CARY (1866), professor of history; *b.* Boston, Mass. He studied at Harvard, the University of Berlin, the Ecole des Sciences Politiques (Paris) and the University of Freiburg. Entering the diplomatic field, he served as acting secretary to the American legation at St. Petersburg in 1890-91, and was Secretary to the American legation at Vienna in 1893. Thenceforward he became associated with Harvard, his alma mater, as instructor in history, assistant professor, professor of history, director of the university library, Harvard lecturer at various French universities and American exchange professor at the University of Berlin. He visited the Philippines in 1905-6 as a member of the Taft party, and was a delegate to the Pan-American Scientific Congress at Santiago, Chile, in 1908-09. He wrote *The United States as a World Power*, which was translated into French and German.

COOLIDGE, CALVIN (1872), thirtieth President of the United States; *b.* Plymouth, Vt. After graduating at Amherst College, Mass., he studied law in Northampton and began to practice there in 1897. He early identified himself with the civic and legal activities of that city. In 1899 he was elected a councilman; from 1901 to 1902 he served as city solicitor; in 1904 he officiated as clerk of courts and chairman of the Massachusetts Republican State Committee; and in 1907 and 1908 he was a member of the General Court of Massachusetts. His entrance into public life in its broader aspects dated from his election as mayor of Northampton in 1910, serving for two years. Thereafter he became a member and president of the State Senate. 1912 - 15; lieutenant-governor of Massachusetts 1916-18; and governor of that State for two terms, 1919-20. During his governorship he came into national prominence through his vigorous action in meeting a strike in the Boston police force. In September, 1919, 1,500 Boston policemen struck to enforce their demands for recognition of their union. causing the city to be almost policeless, and the ensuing riots and robbery resulted in martial law being proclaimed and the patrolling of the streets with cavalry and 5,000 State troops. He was nominated vice-president at the National Republican Convention in 1920 on the Harding ticket and was elected. Mr. Coolidge, for the first time in the history of the Government, was admitted to regular attendance of the Cabinet meetings, and thus kept in close touch with the policies of the Administration. His speeches and writings indicated that although he was of a conservative turn of mind, he was thoroughly in sympathy with the chief policies advocated by President Harding. On the death of the latter, on August 2, 1923, Mr. Coolidge at once took the oath of office and became the 30th President of the United States.

COOLIDGE, THOMAS JEFFERSON (1831-1920), diplomat and railroad director; *b.* Boston, Mass. He received his education at Harvard and in Europe and entered business life as an East India merchant. Later he was identified with the New England cotton industry and large banking interests. He became president of the Chicago, Burlington and Quincy Railroad and remained a director. For a brief period, 1892, he acted as United States minister to France. As a member of the Joint High Commission he took part in adjusting disputes between the United States and Canada.

COONTZ, ROBERT EDWARD (1864). Graduated from the U. S. Military Academy in 1885. Served in Alaska for six years where he became very proficient as a pilot in the surrounding waters. On the voyage of the fleet around the world in 1908 he was executive officer of the Nebraska and was governor of Guam, 1912-13. Appointed commandant of the Navy Yard at Puget Sound in 1915 and was ordered to command the 7th Division, U. S. Atlantic Fleet in 1918. On October 24, 1919, he was confirmed by the Senate as Chief of Naval Operations. Received medals for service in Spanish American War, Philippine Insurrection, Vera Cruz and the World War.

COOPER, SIR ASTLEY PASTON (1768-1841), Eng. surgeon; practiced with great success in London; prof. of Comparative Anat. to Royal Coll. of Surgeons, 1813; pres. Royal Coll. of Surgeons, 1827 and 1836; performed famous operation of tying the abdominal aorta for aneurism, 1817; author of several surgical and anatomical works. the best known on hernia.

COOPER, CLAYTON SEDGWICK (1869). Graduated from Brown University, 1894; studied at Union Theol. Seminary, 1895 - 6; graduated from Rochester Theol. Seminary, 1898; took a special course at Harvard and the University of Chicago, 1898 and 1901, and graduated from Columbia in 1907; Ordained a Baptist Minister 1898 and was pastor of Washington Street Church, Lynn, Mass., from 1898-1902. Made a tour of the world in 1909 under the auspices of the World Student Christian Federation among the students of India, Ceylon, China, Japan and Korea. Spent several years visiting England. Europe, Africa, Asia and South America from 1912-17 investigating educational and industrial conditions. Editorial director of W. R. Grace and Co., and lecturer on foreign trade, travel and other topics. Author of *College Men and the Bible*, *American Ideals*, 1915; *Understanding South America*, 1918; *Foreign Trade Markets and Methods*, 1921. Also a frequent contributor to periodicals on trade and travel subjects.

COOPER, JAMES FENIMORE (1789-1851), an American novelist whose works were mostly of the adventure type for boys. He came of Quaker family, and was *b.* at Burlington in New Jersey. He served for some years in the navy, but he gave that up in 1811, and devoted all his attention to literature. His first book which found its mark with the public was *The Spy*, in 1821; this he followed with *The Pioneers*, in 1823; He also wrote *The Pilot*, in 1823, and it was this work which earned for him undying fame, although *The Last of the Mohicans*, brought out in 1826, is generally considered to be his masterpiece. At this time C. went to live in France, where he wrote for the National on American questions. Whilst he was in Paris he wrote *The Prairie*, in 1827, and *The Red Rover*, in 1828. In the year 1833 C. went back to America and wrote in rapid succession *The Monikins*, *Heathen's Wall*, *The Pathfinder*, *Mercedes of Castile*, and *The Deerslayer*. In 1839 he wrote *The History of the Navy of the United States*. The last years of C.'s life were spent in heated warfare with his critics, and lawsuits followed, in which he came out victorious.

COOPER, PETER (1791 - 1883), manufacturer, inventor and philanthropist; *b.* New York City. His education was scanty, and his family's circumstances early required him to help his father in the latter's various callings as hatter, brewer and brickmaker. He learned the trade of a carriage builder, invented a cloth machine, manufactured cabinet ware, became a grocer, and finally found a stable business in a glue and isinglass factory that he founded on Long Island. The manufacture of glue occupied him for more than half a century and procured him great wealth. Meantime he became an ironmaster, opening, 1830, large works at Baltimore, a rolling and wire mill in New York, and blast furnaces in Pennsylvania. In 1845 he removed his New York plant to Trenton, N. J. He built the first American locomotive, rolled the first wrought iron beams for fire-proof structures, and devised a method of propelling canal boats by an endless chain. Was an active promoter of the laying of the Atlantic cable. He established the well-known Cooper Union, New York City, in 1857. He was a candidate for President in 1876, being nominated by the independent party.

COOPER, THOMAS (1759-1840), Amer. prof. of Chem., dismissed for materialistic views; student of philosophy and economics.

COOPER, THOMAS SIDNEY (1803-1902), Eng. artist; R.A., 1867; famous for cattle studies.

COOPERAGE, the trade of making wooden casks to contain liquids or dry goods, dates back to very early times. Casks intended to contain wine, spirits, beer, etc., are made of oak.

CO-OPERATION, in its special, and modern sense, refers to an organization of people as consumers for the purpose of producing and distributing commodities for their own use, on a collectivist basis. The movement may be considered an economic aspect of Socialism, both having their origin in the conditions created by the introduction of steam-driven machinery in industry. Numerous and varied experiments in co-operative effort were attempted during the first three decades of the nineteenth century, but it was not until 1844 that the Equitable Society of Pioneers of Rochdale, England, established in practice the form which is the basis of the recent success of the movement. The fundamental Rochdale principles are these: membership of the organization to be perpetually open to all comers; one vote, and only one vote, for each member in the government of the society's affairs; the reward of invested capital strictly limited to the current rate of interest; and, most important, that the profits of the enterprises of the organization shall, when not retained entirely as part of the collective fund, be distributed in rebates among the purchasing members, in proportion to the amounts of their purchases. It is this last provision, involving the allocation of trade surpluses, which radically differentiates a co-operative enterprise from a joint-stock company, private profit as the initiative being displaced by social service as the chief purpose. During the early days of the movement up until very recent times it may be said, however, that it was purely utilitarian in character, the co-operative societies being formed solely for the mutual benefits derived from the enterprises conducted in their behalf. The stupendous growth of these enterprises, however, which in some countries are now serious rivals of private industry and trade, has of recent years developed a distinct co-operative social philosophy, having nothing in common with Socialism except the general principle of collectivism. Briefly, it may be said that it is a purely economic movement, in contrast to the political aspects of Socialism, based on the fundamental principle of voluntaryism, or free will, as distinguished from the coercion of majority rule contemplated by Socialism. The process by which co-operative enterprise progresses is purely evolutionary, another contrast to Socialism, whose program may only be put into effect by means of a revolution, whether by force of arms or through a political upheaval at the polls. In common with Socialism, co-operation has as its ultimate object the co-operative commonwealth of all humanity, but the ideal contemplated by the one differs markedly from that of the other. Under Socialism industry and trade would be carried on, either entirely by the state, or by the state in partnership with the people as workers organized on broad industrial lines. Co-operation contemplates a system of industry carried on by a national organization of the people as consumers, to be controlled by them democratically, quite aside from the politically organized state, the workers serving in the enterprises on the present wage basis, with the possible addition of some system of regulating wage questions and working conditions through joint boards. Socialism involves a more or less centralized control of national industry. Co-operation emphasizes the local organization. While retaining full local autonomy, local societies federate for the purpose of carrying on enterprises involving large-scale operations, as in manufacturing, agricultural production, insurance, banking, etc. Yet the big federations remain subject to the control of their local constituents, through quarterly meetings of delegates. Historically speaking, the first local societies usually began business with groceries in England, and with bakeries in Belgium, France and Switzerland. With growing success other distributive enterprises were initiated, such as clothing, dry goods, shoes, etc., until now the larger societies supply their members with all the necessities of life and many of the minor luxuries. Many build houses which are rented out to members, conduct recreational centers, including theatres and concert halls, etc., and as in England, carry on an insurance business as agents of a central insurance federation. Federation was first effected for the purpose of manufacturing, but later these federations acquired land and engaged in agriculture, as in the case of the British societies, which through their two national federations, the Scottish and the English wholesale societies, grow tea on several thousands of acres of tea plantations in Ceylon and India, grow wheat on vast tracts in Canada and raise dairy products on farms at home. The movement had made comparatively little progress in this country, up to the period of the World War, but since then there has been considerable development. In 1916, when the Co-operative League of the United States was founded, there were about 600 local co-operative societies in this country. In 1923 there are about 3,000 local societies. These have formed local federations, as in the Central States Wholesale Society in East St. Louis, Ill., representing about 100 local societies in the surrounding region, and the Co-operative Exchange, of Superior, Wis., a federation of about an equal number of societies. The Co-operative League, mentioned above, is an educational federation of about 500 societies throughout the whole country, its headquarters being in New York. In Great Britain the greatest development has been achieved, the enterprises of the movement including the largest flour mills, boot factories, bakeries in the country, the membership of the local societies including over 5,000,000 heads of families in 1921. In Switzerland approximately half the population is affiliated, while in Russia practically all distribution is carried on through co-operative stores. Before the World War the membership of all co-operative societies in Europe, including Asiatic Russia, was about 8,000,000. In 1923 the total membership is estimated at 32,000,000.

COOPER UNION or COOPER INSTITUTE, an educational institution for the working classes situated in New York City, founded by the New York philanthropist, Peter Cooper, in 1854, and named after him. The institute is housed in a large building at the junction of the Bowery with Third and Fourth Avenues. The founder deeded the land and buildings, which were valued at $630,000, to a board of trustees. His object was to provide free instruction to working people in the sciences and the arts by means of day and evening classes, especially the technical knowledge relating to mechanical and engineering callings demanded by the development of modern industrial methods. The institute's endowment was helped by a further gift of $100,000 from the founder by his will, and also by substantial sums from William and Edward Cooper, Abram S. Hewitt and Andrew Carnegie, the last named giving $600,000. The institute has a museum, an art gallery, a school of art for women, an extensive library and a large public reading room where hundreds of current magazines and newspapers are on file. The instruction embraces courses in engineering, electricity, chemistry, physics, astronomy, mechanical, architectural and ornamental drawing, clay modeling, painting, music, English literature, wood engraving, pottery, typewriting, stenography, telegraphy and elocution. Degrees are conferred in science and engineering and there are scholarships open to students. In 1922 the teaching staff numbered 73 under the directorship of Charles R. Richards.

COORG (11° 56′ to 12° 45′ N., 75° 25′ to 76° 13′ E.), province, Brit. India; area, 1,582 sq. miles; bounded N. and E. by Mysore, S. and W. by Madras; capital, Merkara. Most of surface is covered by forests; crossed by W. Ghats; watered by Cauvery and its affluents. C. produces coffee, rice, cinchona, cardamon. Natives are called Kodagas; most of them are Hindus; other religions, Mohammedanism, Animism. C. is administered by chief commissioner; was a native princedom and was annexed to Britain in 1832; has many ancient ramparts. Climate is comparatively cool, abundant rainfall. Pop. 1921, 168,838.

COOT (*Fulica atra*), bird belonging to rail family, frequents inland waters and estuaries of the Old World; expert swimmer, diver, and flier; builds its nest between reeds; favorite water-fowl for shooting; other species in America, Africa, and Australia; *F. newtoni*, in Mauritius, extinct.

COOTE, SIR EYRE (1726-83), Brit. general; distinguished himself in India in Seven Years War, and, 1781, defeated Hyder Ali at Porto Novo.

COPAIBA, COPAIVA, aromatic acrid

balsam or oleo-resin procured from trunk of *Copaifera Lansdorfii*, a tree of N. and S. America; oil used therapeutically.

COPAL, hard, brown to colorless resin, obtained from *Trachylobium* and other trees of S. America and Africa; on the mainland coast of Zanzibar a wide deposit of valuable fossil c. is being exploited by digging it up from the soil in lumps of various sizes; used as chief constituent of varnishes.

COPÁN (14° 41′ N., 89° 28′ W.), ruined Ind. city, on Rio Copán, W. Honduras.

COPARCENARY, TENANCY IN, legal term relating to joint inheritance of an estate by two heirs. The heir at law is usually an eldest son, but for females there is no rule of primogeniture, and when an estate is left to daughters they hold the property as *coparceners*.

COPE (O. E. *cape*), a vestment worn by R.C. and by some Anglican clergy, in processions, at vespers and on other ceremonial occasions of lower importance than the Mass.

COPE, CHARLES WEST (1811-90), Eng. artist; was painter of many of the frescoes in the House of Lords; also an etcher. Pub. his *Reminiscences*, 1889.

COPE, EDWARD DRINKER (1840-97), Amer. palæontologist; curator, Academy of Natural Sciences; served on U. S. Geological Survey, subsequently prof. of Geol., Univ. of Pennsylvania; discovered more than 500 species of extinct vertebrates.

COPECK. See KOPEK.

COPELAND, CHARLES TOWNSEND (1860), author, *b.* Calais, Me. He studied at Harvard, graduating therefrom in 1882, and became lecturer on English literature in that university in 1893, assistant professor of English in 1910, and associate professor in 1917. His writings include a life of Edwin Booth.

COPELAND, ROYAL SAMUEL (1868). Graduated from the University of Michigan, 1889, and took postgraduate course in medicine in England, France, Germany, Switzerland and Belgium. Received Hon. A.M., Lawrence University, 1897, Hahnemann College, Phila., 1921. Was house surgeon of the University Hospital from 1889-90, and professor of ophthalmology from 1895-1908 at the University of Michigan. Served as Dean of New York Homeopathic Medical College and Flower Hospital and as a professor of ophthalmology from 1908 to 1918. Appointed commissioner of public health and president of the Board of Health, New York City, 1918. Was a member of the New York State Committee Medical Section of the Council of National Defense in 1917. Author of *Refraction* (text-book), 1899-1905; *Scientific Reasonableness of Homeopathic*, 1909. Elected in 1922 to the United States Senate from the State of New York. Term will expire, 1929.

COPENHAGEN, cap. of Denmark (55° 41′ N., 12° 35′ E.), situated on E. shore of Zealand, with suburbs, called Christianshavn, on island of Amager, connected at two places. The channel between Copenhagen and Slottsholm I. forms a spacious harbor and great naval station, which, with forts to seaward and fortifications with canals for flooding land approaches, renders Copenhagen an important stronghold. Portion of town, cut off by canals, forms Castle I., or Slottsholm, with public buildings including royal palace of Christiansborg, ministry buildings, univ. 1479, royal library, Thorwaldsen Museum. Other important buildings are cathedral, Trinitatiskirke, Rosenborg Castle, built 1604-5, Charlottenborg Palace, museum, with unrivalled northern antiquities, new town hall, and sculpture museum. The principal public square—where twelve streets meet (statue of Christian V. in center)—constitutes heart of city. The industries are shipbuilding, distilling, sugar refining, brewing, etc.; exports butter, bacon, corn, etc. In 1891-4 part of port was made a 'free harbor.' A train ferry connects the city with Malmö in Sweden.

Copenhagen started as a fishing village, *c.* 1043; haven erected by Bishop Absalon, *c.* 1100 as a refuge from northern pirates; made capital by Christopher II. 1443; partially burned in 1788-94 and 1795; Nelson defeated the Danes here, 1801, and in 1807 Lord Cathcart captured the city and Dan. fleet after four days' bombardment. Center of Scandinavian culture. Pop. (without suburbs) 506,400.

COPERNICUS, NICOLAUS, KOPPERNIGK (1473-1543), Polish astronomer; studied at Cracow, Bologna, Padua, and Ferrara; undertook the duties of physician administrator of a diocese and various other political work. At the same time he created a new conception of astron., enunciated in his treatise, *De revolutionibus orbium coelestium* (pub. 1543). His theory that the earth and other planets revolve round the sun, now a truism, at the time gave rise to a keen controversy, especially among the Rom. clergy.

COPIAPÓ (27° 21′ S., 70° 32′ W.), town, on Copiapó, Chile; important mining center. Pop. 9,500.

COPING, crowning, or capping, course of a wall.

COPLEY, JOHN SINGLETON (1735-1815), an American historical painter, *b.* at Boston, Mass. Studied at Rome, 1774, and came to England; made Academician in 1783. He was the father of Baron Lyndhurst (*q.v.*). His best known paintings are *Death of Chatham* and *Death of Major Pierson.*

COPPÉE, FRANÇOIS EDOUARD JOACHIM (1842-1908), Fr. author; was a prolific writer of poetry, plays, and novels, some of his work being marred by excessive sentimentality.

COPPER, a metal coming probably next to iron in its antiquity of use, its name being derived from the Island of Cyprus, where it was first obtained by the Greeks. In ancient times it was seldom used in an unalloyed state, being usually mixed with other metals, in the form of bronze, the alloy being mostly tin. The first mines of more modern times were worked in Cornwall, Great Britain. At the present time the bulk of the copper mined is from the United States, a large portion of this again being taken from the famous Anaconda mines in Montana, near Butte, the veins here being sometimes two feet in thickness. Practically all of the copper mined in this district is found within an area two miles square. The first of these mines were mostly opened as silver mines, copper being found at a greater depth. About 20 per cent of the national production of copper is from this district. Second in importance are the mines in and around Keweenaw, Mich., the Lake Superior region. The workings in Arizona, chiefly around Bisbee, are more recent, being opened in 1880, and have not yet been developed to their full capacity. The presence of copper ore in paying quantities has also been discovered in Nevada and Alaska. The process of reducing the ore does not differ fundamentally from that employed in the reduction of other metals. The ore is first concentrated, by hand picking, or by means of wet or dry jigging tables, after which it is subjected to hydraulic separation, the force of the water removing all the foreign matter capable of being dissolved, such as clay or sand. It is then put into the smelter, being roasted in an oven, where the more volatile elements, such as arsenic, bismuth and antimony are removed. The next stage takes in the blast furnace, where it is smelted together with anthracite coal as a fuel. The residum is again subjected to baking, after which a second treatment in the blast furnace follows. The result of the operations up to this point is what is technically known as 'black copper,' a solid metal, but still highly impure, in which may still be found iron, nickel, cobalt, lead, zinc, tin, arsenic, antimony, bismuth, sulphur, selenium and even silver and gold. From this point onward the process of refinement continues until the metal is at least 90 per cent pure, when it is cast into ingot bars or cakes. The refining is done by two methods; repeated smeltings, and by the electrolytic bath, a process similar to electroplating.

The copper industry ranks as one of the most important in the United States. According to the census of 1919 there were then 43,717 wage earners in the industry, working in 195 separate enterprises. Of these 75 were in Arizona, employing over 14,000 workers. The smelter production for the year 1921, according to the United States Geological Survey, was nearly 500,000,000 pounds. Importations during that year were about 300,000,000 pounds, home production not being nearly enough to meet the national demand. On the other hand, about 570,000,000 pounds were exported, in the form of finished manufactured articles, such as wire, rods, pipes, and sheets. In this same year the productive capacity of the copper mines of the United States were estimated at about two billion pounds annually, while the capacity of the refineries was about 500,000,000 pounds more than that, this larger capacity being for the handling of imported copper not yet refined.

COPPER GLANCE (Cu_2S), soft dark grey mineral, also occurring in six-sided, frequently twinned crystals; ore found in the upper parts of copper deposits.

COPPERAS, ($FeSO_4.7H_2O$), green vitriol or ferrous sulphate, blue-green crystals, used for manufacture of ink, in tanning and dyeing.

COPPERHEADS, opprobrious term applied to the Southern sympathizers during Amer. Civil War.

COPPERMINE (66° 40′ N., 115° 30′ W.), river, Canada; rises in Lake Providence, flows N. W., and enters Coronation Gulf, in Arctic Ocean; not navigable; discovered by Hearne, 1771.

COPPER PLATE. See ENGRAVING.

COPPER-PYRITES, CHALCOPYRITE ($CuFeS_2$), important copper ore, brass-yellow tetragonal crystals, often mixed with iron pyrites, occurring in N. America, Spain, S. W. England, Central Germany, and elsewhere. When tarnished with a blue iridescence the mineral is known as 'peacock ore.'

COPPER or **ATNA RIVER,** a waterway in Alaska, about 300 miles long rising in a glacier on Mount Wrangell in the Circle Land District and flowing west and south of its source into the Gulf of Alaska on the Pacific, just west of Controller Bay. Its bed contains copper. Its upper course after clearing Wrangell, is over a broad plain; later it breaks through the Chugach mountains, where its flow to its delta is obstructed by rapids and glaciers. Its basin extends over an area of about 23,000 square miles.

COPRA, broken, dried kernel of cocoanut exported from Pacific islands for manufacture of cocoa-nut oil.

COPROLITES, fossilized dung often containing bones and teeth of extinct animals, mainly reptiles and fishes, occurring in Lias and younger formations. When found in large quantities, as in Cambridgeshire and Suffolk, they are exploited for fertilizing purposes as phosphates.

COPTOS (*c.* 26° N., 32° 53′ E.), ancient city, on Nile, Egypt; modern Kuft; starting-point of several routes to Red Sea; had extensive trade with Arabia and India in perfumes and incense; site of excavations by Petrie, 1894.

COPTS (from Arab. *Kibt*, from Gk. *Aigyptioi*, Egyptians), Christian sect of modern Egyptians, descended from ancient Egyptians; probably, except for early Gk. intermixture, pure race, as religious differences prevented intermarriage with Arabs. They constitute less than one-fourteenth population of Egypt, greater number of inhabitants embracing Mohammedanism after Arab invasion and losing appellation 'Egyptians;' distinguished from Mohammedan inhabitants, who also preserve Egyptian type with Arab intermixture, by smaller build and pallor, due perhaps to their refusal to perform rougher kinds of labor, and their employment as fine craftsmen, clerks, etc. Egypt was Christianized at an early date; the religious difference which made C's distinct people broke out in V. cent.; Council of Chalcedon, 451, condemned Monophysitism. C's clung to this heresy, and have ever since made it cardinal doctrine; separated from general progress of Church, their ritual is interesting as preserving ancient forms; influence of Brit. occupation has been to modify Coptic characteristics in dress, customs, and religious conservatism. Language is ancient Egyptian modified by Gk., there being formerly many dialects; not employed in Lower Egypt since X. cent., nor Upper Egypt since XIV.; preserved in lessons of Christian service, but afterwards explained in Arabic, their present tongue; handwriting keeps Gk. uncial; lit. chiefly patristic.

COPYHOLD in Great Britain is customary tenure in which the copyholder is entitled to the property subject to the performance of certain duties. The rights and duties of copyholders vary according to the particular manor to which they are attached. The owners can generally dispose of their property by will, and if they die intestate, it descends to the customary heir, who may, or may not, be the same as the heir-at-law. On the death of a copyholder intestate, and without heirs, the property escheats, not to the crown, but to the lord of the manor.

COPYRIGHT, a term applied to the legal protection which confers on an author or other interested person exclusive property rights in his creative work. In the United States copyright protection covers a much wider field. It extends to maps and charts, the arts of designing, engraving and etching, oral lectures, sermons and addresses, phonograph records, musical productions, and motion pictures. Other works that can be made the subject-matter of copyright protection include composite and encyclopedia productions, directories, gazetteers, all kinds of periodicals (newspapers, magazines, bulletins, circulars, etc.), dramatic and musical compositions, scientific or technical drawings or plastic models, photographs, prints and pictorial illustrations.

Copyright is based on or amplifies common right as affirmed by common law. Any writer of a letter or script of whatever character, or any designer of a drawing, is protected by law from unauthorized publication by others. But common law, while thus guarding from invasion on an author's well-defined property rights in the form and style of his composition, ceases to protect an author once his works are made public. It is here that copyright legislation shields his work from piracy. Copyright, under the law of 1909 and its amending acts of 1912, 1913, and 1914, confers on persons complying with its provisions the exclusive right to print, reprint, publish, copyright, and vend the copyrighted work, whatever it may be. It may relate to translations, the dramatizing of a narrative or novel, or converting a drama into a story, or musical compositions. Such works can be copyrighted for 28 years from date of entry, and for a second term of the same length of time. As to procedure, works to be copyrighted must first be published, with the claim to copyright printed thereon, and two copies (or only one if a foreign work) must be filed with the Copyright Office, Library of Congress, with an application for registration. Registration of any printed work costs a dollar, and the work is thereupon protected.

Infringement of copyright has been held to mean both the reproduction of an author's words and phrases and of the substance of the plot or scheme of his work. An author, thus injured, can seek an injunction restraining the offender from continuing the infringement. But a writer has no proprietorial right in statements of facts collected or compiled by him and therefore cannot copyright mere information. Such data can be utilized by anybody so long as it is presented in a form or arrangement different from that in which it appears in the source from which it is obtained. Nor can ideas be copyrighted; only their form. The same idea can be expressed in a dozen different forms and structures, and not one would infringe the copyright of any of the others. Nor is there any copyright in a title; but the title of a work, by its selling appeal, can secure a copyright for itself in creating a commercial value, which the courts have ruled shall not be damaged by others appropriating it for a similar work.

Citizens of other countries that grant reciprocal copyright privileges to American citizens can secure protection for their works in the United States. In the fiscal year of 1921-1922, works to the number of 138,633 were copyrighted.

COQUELIN, BÉNOIT CONSTANT (1841-1909), the greatest Fr. actor of modern times. His bro., Ernest Alexandre Honoré, Coquelin Cadet, 1848-1909, also won fame as an actor and writer of monologues.

COQUET (55° 20′ N., 1° 35′ W.), river, Northumberland, England; rises in Cheviot Hills; enters North Sea at Alnwick Bay.

COQUIMBO (29° 50′ S., 71° 20′ W.), seaport (and province), Chile; chief industry, copper-mining. Pop. of town, 12,000; province, 1920, 160,256.

CORAL, the hard, chiefly limy skeletons of certain Cœlentera, notably the millepores, the madrepore or reef corals, the horny Antipatharia, and the Alcyonaria, which include the deadmen's-fingers (*Alcyonium*), the organ-pipe c. (*Tubipora*), the sea-pen (*Pennatula*), the red c. (*Corallium*) and blue c. (*Heliopora*). The most important c's are the Madreporaria, which form c. rocks, reefs, and islands in tropical seas ordinarily between 30° N. and S. of the equator. Reefs may either be fringing an island or be separated from the land by a shallow lagoon channel (barrier reef), or from a ring-shaped *atoll* with a central lagoon. As c's are killed by fresh water and deposits of mud and sand, they find more food and grow fastest on the seaward side of the reef, and a channel is left opposite to the mouth of a creek or river. Since c. cannot live below a certain depth, c. islands must have been formed on submarine peaks rising to about 40 fathoms below sea-level, or raised to that height by the constantly falling débris of marine organisms or by volcanic action. Another explanation (Darwin's) holding good for a few atolls is that islands have gradually subsided, the fringing reef c. growing accordingly, and thus forming an atoll. It is certain, however, that the rate of growth of c. is considerable, under favorable conditions up to 9 in. per annum.

CORAL FISHES. See FISHES.

CORALLIAN, a not very clearly defined subdivision of the Middle Oolite of the Jurassic period, consisting chiefly of grits and limestone composed of coral (Coral Rag); well developed in the cliffs near Weymouth.

CORAOPOLIS, a city of Pennsylvania, in Allegheny co. It is 10 miles N.W. of Pittsburgh. It is the center of an extensive petroleum and natural gas district. Pop. 1920, 6,162.

CORATO (41° 8′ N., 16° 25′ E.), city, Apulia, Italy. Pop. 42,000.

CORBEIL (48° 36′ N., 2° 26′ E.), town, department of Seine-et-Oise, France; has important flour-mills, printing-works, and paper-works. Pop. 10,000.

CORBEL (arch.), term for stone bracket supporting a superincumbent weight.

CORBIN, HENRY CLARK (1842-1909), American military officer, *b.* Clermont co., Ohio. He intended to study law but at the outbreak of the Civil War entered the Union Army, serving throughout the conflict and receiving the rank of brevet brigadier general in 1866. Following the disbandment of the volunteer army, he was commissioned as second lieutenant in the regular army and was active in Indian campaigns. During the Spanish-American war he was adjutant general of the army and in recognition of his services was made major general. He commanded in the Philippines, 1904-06, and was made a lieutenant general. He retired from the service in 1906.

CORBIN, JOHN (1870), American writer and critic. Graduated from Harvard, 1893. Asst. editor of Harper's Magazine, 1897-1900. On editorial staff of Encyclopedia Britannica, 1900-2. Dramatic critic of the N. Y. Times, 1902, and again in 1917. Literary manager, New Theatre, N. Y., 1908-10. Author *The Elizabethan Hamlet, Schoolboy Life in England—An American View, An American at Oxford, The First Loves of Perilla, Which College for the Boy, The Edge.* Has contributed many articles on education and the drama to leading magazines.

CORBULO, GNÆUS DOMITIUS (fl. I. cent. A. D.), Rom. general; made canal between Meuse and Rhine, and won great successes against Parthians; committed suicide at Nero's order.

CORCORAN, WILLIAM WILSON (1798-1888), an American banker, born in Georgetown, D. C. He accumulated a large fortune in the banking business, a large part of which he dispensed through charities. He founded the Corcoran Art Gallery in Washington.

CORCYRA, ancient name of Corfu.

CORDAY, D'ARMONT, MARIE ANNE CHARLOTTE (1768-93), heroine of Fr. Revolution. Of noble family of Normandy; carefully educated; absorbed Rom. republican ideas and, emulating Brutus, assassinated Marat as the tyrant who had overthrown the Girondins; guillotined.

CORDELE, a city of Georgia, in Crisp co., of which it is the county seat. It is on the Georgia Southern and Florida, the Seaboard Airline, and other railroads. It is surrounded by an extensive cotton growing region and has manufactures of cottonseed oil and lumber. It has handsome public buildings, including a library. Pop. 1920, 6,538.

CORDELIERS, CLUB OF THE, a prominent organization at time of Fr. Revolution; its leaders were Danton, Marat, Hébert, Camille, Desmoulins; when Robespierre executed leaders, 1794, the club declined.

CORDES (44° 3′ N., 1° 58′ E.), town, Tarn, France.

CORDILLERA, Span. term for chain or ridge of mountains; first applied to chains of the Andes, S. America; now applied to ranges in N. and Central America.

CORDITE, smokeless, buff-colored, heat-and-damp-resisting explosive consisting of 58 per cent nitroglycerine, 37 per cent gun-cotton, and 5 per cent mineral jelly (mark I.), used in cartridges for small arms and ordnance in the Brit. army and navy. A modification known as cordite M. D., 65 per cent gun-cotton, 30 per cent nitro-glycerine, and 5 per cent mineral jelly, is also used on account of its higher velocity, more even pressure, and less erosion of the bore of a gun.

CÓRDOBA (*c.* 31° S., 65° W.), province, Argentine Republic; chiefly pampa land; watered by Primero, Segundo; metals found; chief industry is cattle-rearing. Area, 66,912 sq. miles. Pop. 1921, 805,940.

CÓRDOBA (31° 24′ S., 64° 6′ W.), city, capital of C. province, Argentine Republic, on Rio Primero; founded 1573; has handsome cathedral and univ., 1613; formerly center of Jesuit learning. Pop. 150,000.

CÓRDOBA (18° 42′ N., 96° 50′ W.), town, Vera Cruz, Mexico; important coffee producing center. Pop. 70,000.

CÓRDON, cord, band, sash, etc., used in personal adornment; thus the *Cordon bleu* was the ribbon of the Fr. Order of the Holy Spirit. The word is also used to describe the defences of a protected area.

CORDOVA (38° N., 5° W.), province, S. Spain; occupies fertile valley on slopes of Sierra Morena; traversed by Guadalauivir; industries, sheep farming; fruit and olive growing; chief town, Cordova. Area, 5,299 sq. miles. Pop. 1920, 539,125.

CORDOVA, CORDOBA (37° 52′ N. 4° 48′ W.), town, Spain, capital of province C., on Guadalquivir; with Moorish walls, VIII.-cent. bridge, gorgeous cathedral (VIII. cent.; formerly mosque), and other fine churches; remains of Moorish palace; arena, library, museum; once famed for *Cordovan* (goat leather), now textile fabrics silverware, etc. Roman *Corduba* was founded II. cent. B. C.; magnificent city under Moorish rule, VIII.-XIII. cent.; taken by Ferdinand of Aragon, 1236; birthplace of Senecas, Lucan, and Averroës. Pop. 66,500.

CORDOVA, GONZALO FERNANDEZ DE (1453-1515), Span. soldier; figured in subjugation of Portugal and of the Moors under Ferdinand and Isabella; sent, 1495, to recover Naples from France, and restored Ferdinand of Naples, 1498, winning title of 'Great Captain' (*El Gran Capitan*); led Span. forces in conquering Naples for Spain and France. C.'s methods mark an epoch in history of war.

CORDUROY. See Cloth.

CORDUS, AULUS CREMUTIUS, Rom. historian under Tiberius; wrote on Augustan Age.

COREA. See KOREA.

CORELLI, MARIE (1864), Eng. novelist; her first story was *A Romance of Two Worlds*, 1886, and her later stories have achieved wide popularity.

CORENZIO, BELISARIO (*d.* 1643), Ital. artist.

CO-RESPONDENT, in divorce petition person charged by husband with having committed adultery with latter's wife.

COREY, HERBERT (1872). Public school education. Was connected with various newspapers in the Western United States until 1900 when he became correspondent for the Cincinnati Inquirer. Was later traveling correspondent for the Cincinnati Times-Star and Associated Newspapers and was a war correspondent in Europe and with the A. E. F. in France during the World War.

CORFE, CASTLE (50° 37′ N., 2° 3′ W.), town, Isle of Purbeck, Dorsetshire, England; ruined castle was scene of murder of Edward the Martyr, 978; besieged by Roundheads, 1643.

CORFINIUM, chief town of the Pelgini, Samnium, ancient Italy; capital of Allies in Social War, 90 B. C.

CORFU. (1) Isl. of Greece (39° 35′ N., 19° 50′E.); largest and most important of Ionian group, in Mediterranean, separated from Albanian coast by strait about 2 to 6 m. broad; length, 40 m.; breadth, 20 m.; area, 270 sq. m.; divided into three districts by mountain ranges; highest point, 3,000 ft.; beautiful scenery; exports oranges, wine, oil, grapes and soap; anc. *Corcyra* was a Corinthian colony, founded *c.* 700 B. C.; alliance with Athens led to Peloponnesian Wars; under Venice, 1205-1797; under Naples, 1267-1386; under Brit. protection, 1815-63, when joined kingdom of Greece. During the World War Serbian army retreated for succor and reorganization to Corfu, which was temporary seat of Serbian government; isl. occupied by Entente Powers, who took over the Ger. emperor's villa-palace, the Achilleion. Pop. 100,000 (2) Seapt. on E. coast; good harbor. royal palace, library, etc. Pop. 20,000,

CORIANDER, fruit of *Coriandrum sativum*, an umbelliferous plant. The extracted oil is used as a stomachic stimulant, the young leaves in cookery.

CORINGA (16° 50′ N., 82° 15′ E.), small seaport, on N. mouth of Godavery, Madras, Brit. India.

CORINNA (fl. 500 B. C.), Gk. poetess; rival of Pindar; famed for her beauty.

CORINTH. (1) Anc. and modern city, on Gulf of Corinth, Greece (37° 55′ N., 22° 56′ E.). New Corinth has arisen since destruction of old town by earthquake, 1858; lies some 3 m. distant from anc. site; but, notwithstanding completion of Isthmian canal, 1893, has regained little of Corinth's historic prosperity and splendor; exports currants, oil, wax, honey, wheat, etc. From earliest times Corinth played a leading rôle in Gr. history; its geographical situation gave it great maritime and commercial importance; its industries (copper work, dyeing, weaving, etc.) brought it riches; its colonies (*e.g.*, Corcyra and Syracuse) spread its fame abroad; its arch. constituted the most decorative order of Gr. arch.; its luxuriance was proverbial. Amer. archæologists have recently excavated some of its famous fountains, temples, theatres, etc. The lofty Acrocorinthus (anc. natural fortress) overlooks the ruins. A long-established oligarchy was overthrown, *c.* 650 B. C., by Cypselus, who, followed by Periander, maintained a beneficent tyranny till 582, and raised Corinth to pitch of prosperity and power. City joined Sparta against rival Athens in Peloponnesian War, 431; from 335-197 B. C. (except from 243-222) under Macedonian rule; sacked by Romans (146; works of art removed to Rome); rebuilt by Cæsar, 46 B. C.; St. Paul's visit, *c.* A. D. 50; taken by Alaric, 396; by Normans, 1147; by Turks, 1459; under Venetians, 1698-1715; finally recovered by Greeks, 1822. Pop. 4,200. (2) Gulf of Corinth or Lepanto separates Hellas from Morea; shores fertile but liable to earthquakes; scene of many battles; (3) Isthmus of Corinth separates Gulf of Corinth from Gulf of Ægina; connects Morea with Attica; ship canal (opened 1893) is little used by steamers. The ruins include the Isthmian Wall and the temple of Poseidon.

CORINTH, a city of Mississippi, in Alcorn co., of which it is the county seat. It is on the Southern, the Illinois Central, and the Mobile and Ohio railroads, 93 miles east of Memphis, Tenn. It is an important industrial community and has machine shops and woolen mills. Corinth during the Civil War was the scene of many battles. Engagements were fought here on April 24 and 29, 1862, and on April 30. Railroad communications with the North were cut by the Union forces. During May of the same year several encounters took place. On October 4 the combined Confederate forces attacked the Union lines at Corinth and after a bitter engagement the Union Army was driven back into town. They rallied and the Confederates were finally repulsed. Both sides suffered severe losses. The Confederates lost also vast quantities of stores.

CORINTHIAN ARCHITECTURE. See ARCHITECTURE.

CORINTHIANS, EPISTLES TO THE.—Letters by St. Paul to Christians of Corinth, forming two books of New Testament. Clement of Rome makes mention (*c.* 95) of Epistle of Paul to C.'s, and these books are quoted by various writers in II. cent. Modern 'Dutch school' questions authorship and puts forth theory, for which there seems little evidence, that it was written by miscellaneous writers in II. cent. General difficulty is felt in accepting *II. Corinthians* 6^{14}-7^{1} and chapters 10-13 as part of original epistle, although written by St. Paul. Epistles are important as adding to biography of St. Paul in *Acts*, for contemporary picture of early Church, and for doctrinal points. First Epistle was written, 54-58, during St. Paul's stay at Ephesus after he left Italian-Gk. city of Corinth, where he founded Christian Church in middle of I. cent.; it deals with advisability of celibacy, mixed marriages, lawfulness of eating meat offered to idols, status of women, and political position of Christians. Second Epistle was written a year later for building up Church after internal dissensions and preaching of 'false prophets.' Pseudo-Epistle of C.'s to St. Paul and reply of apostle, not included in Bible canon, were recognized by Church of Syria in IV. cent., but discovered to be part of II. cent. compilation of *Acts of St. Paul*.

CORINTO (12° 28′ N., 87° 2′ W.), seaport, Nicaragua, Central America; large export trade.

CORIOLANUS, GAIUS (GNÆUS) MARCIUS, general in mythical period of Rom. history. The legend, probably invented to explain capture of Corioli, is recounted in Plutarch's *Lives* and Shakespeare's *Coriolanus*.

CORIOLI, ancient city, Latium; capital of the Volscians; taken by Coriolanus, 493 B. C.

CORIPPUS, FLAVIUS (VI. cent. A.D.), Rom. epic poet.

CORISCO (0° 50′ N., 9° 30′ E.), bay, Coast of Guinea, West Africa.

CORISCO (0° 55′ N., 9° 22′ E.), small island, belonging to Spain, at mouth of Corisco Bay; exports ebony and logwood.

CORK, outer layer of the bark of the cork tree (*Quercus suber*), growing in W. Mediterranean countries, cultivated in Spain and Portugal. It is cut every eight or ten years, and is used for many purposes on account of its lightness, elasticity, and relative imperviousness to air and liquids; not used to stop bottles till XV. cent.

CORK. (1) Mar. co., Munster, Ireland (51° 54′ N., 8° 28′ W.); largest and farthest S. in Ireland; generally hilly—in the W. mountainous and boggy, and in the E. rich and fertile. A mountain range divides Cork into parallel basins through which flow the rivers Blackwater, Lee, and Bandon. There are many small lakes in the W. The coast, which is exceedingly indented, is about 250 m. long, has many beautiful bays, some of which run from 3 to 25 m. inland. The chief are Bantry, Dunmanus, Roaring-water, Glandore and Cork Harbor; large number of islands off the coast, the most notable being Cape Clear I., most southerly point of Ireland. Dairy farming is extensively carried on. Minerals little worked; at Mallow there is a thermal magnesian spring. Most important manufactures are leather, tweeds, whisky, and porter. Principal towns are Cork, Queenstown, Kinsale, and Youghal. Area, 2,890 sq. m.; pop. 391,200. (2) Cap. of above and third Irish city; railway center; on Lee, at head of Cork harbor; univ. coll.; dairy and agricultural school; industries are manufactures of automobiles, tanning, distilling, brewing, ironfounding, woolens; exports butter, provisions, live stock, hides, eggs, etc.; races are held in the Park. City probably dates from monastery of St. Finbar, 7th cent.; plundered by Danes in 9th cent.; submitted to Normans, 1172; surrendered to Cromwell, 1649; taken by William III, 1690. Pop. 76,600. Cork was the scene of severe rioting during the disturbances preceding the establishment of the Irish Free State. A large part of the city, including many public buildings, was destroyed by fire in 1921. Terrence McSwiney, lord mayor, convicted of treason, died in prison after refusing to take food. (3) Cork Harbor, landlocked natural harbor at mouth of Lee; Queenstown is on Great I.; Spike I. is fortified; ordnance depot and royal naval dockyard at Haulbowline.

CORK, RICHARD BOYLE, 1ST EARL OF (1566-1643), Eng. statesman; bought in 1602 Sir Walter Raleigh's Irish lands, 12,000 acres, in Cork, Waterford and Tipperary; Earl of C., 1620; app. Lord Justice, 1629; Lord High Treasurer, 1631; predominance in Ireland ended with Strafford's appointment as Lord Deputy under Charles I.

CORK AND ORRERY, MARY, COUNTESS OF (1746-1840), Irish lady, famous for her literary *salons*.

CORLEONE (37° 49′ N., 13° 17′ E.), town, Palermo, Sicily; two mediæval castles and some interesting churches; also mineral springs. Pop. 15,000.

CORLISS, GEORGE HENRY (1817-88), American inventor, *b.* Easton, New York. He patented various improvements in steam engines and built a great plant at Providence, R. I., in 1856. He constructed the giant engine named after him which drove all the machinery at the Centennial Exposition in 1876.

CORMORANT (*Phalacrocorax*), large water-bird of the order Ciconiiformes, widely distributed. The green c. or shag (*P. graculus*), is smaller, and does not often venture inland.

CORN, INDIAN, or MAIZE, a prolific grain believed to be native to the tropical regions of America. The early colonists found the Indians cultivated the plant, and named it Indian corn to distinguish it from that grown in the Old World, where wheat, barley, rye and other grains are known as corn. The general cultivation of Indian corn in temperate climes dates from its discovery on American soil, though there is a supposition that a similar grain was once grown in ancient China and in the East. If, however, the Old World was ever really acquainted with the plant known as Indian corn, its cultivation was neglected; at any rate it was viewed as a new and strange plant when Columbus brought it to Spain, whence its growth spread slowly over Europe, Asia and Africa, and later to Australia.

On the American continent corn is grown from Canada to Argentina. It is an annual crop, and has several types grown for grain. Among them are Pop, Flint, Dent, Soft or Flour, or Sweet or Sugar Corn. The plant generally reaches a height of from two to fifteen feet, according to its type and variety; its ears vary from one to fifteen inches in length. The white and mealy portions of the kernel consist chiefly of starch; most of the protein is in the hard and flinty parts; and the germ contains most of the oil. The kernels of pop corn burst open when heated. Flint corn has a mealy starchy substance enclosed in a hard and flinty kernel. It is used for feeding, like dent corn, whose starchy portion extends to the summit of the kernel. The contents of soft corn are mealy and white. Sweet corn, with its horny kernels, is dried or canned, or consumed in the green state. Other types are Dwarf Golden or Rice pop corn, King Philip and Longfellow flint corn, Reid Yellow, Leaming, and Boone County white dent corn, Curzo soft corn, Early Boston Market and Stowell Evergreen sweet corn, and pod corn, in which each kernel is enclosed in a pod or husk.

The roots of corn are fibrous and extend in all directions, spreading from four to twelve inches beneath the surface. The crop is planted in hills or rows or drills, usually in May, when the soil is warm and moist. It is grown either for the grain, when only the mature ears are harvested after the plant has dried, or for fodder and silage, in which case the crop is cut as the ears begin to harden. Corn is mainly grown as cattle feed, but it is also extensively utilized for cereal breakfast foods, while it also figures in the production of starch, glucose, paper, varnish, gun-cotton and other materials. As a table vegetable its culture is quite extensive near large cities, where it is cultivated as a truck crop, and in some districts for canning purposes. Generally, its cultivation calls for better land and farming than any other of the staple crops. The harvest takes place in the fall.

The world's crop of corn exceeds that of all other staples; in 1921 it amounted to 3,710,115,000 bushels. In 1922 the area laid to corn in the United States covered 103,224,000 acres, which produced 2,875,000,000 bushels of a value of $1,801,900,000. The United States contributes between half and three-fourths of the world's supply.

CORN LAWS, in England, State regulations of traffic in corn (*i.e.*) wheat. The principle of intervention in trade was approved in England until XIX. cent., and has been advocated in late years by Tariff Reformers. Earliest legislation was directed against export in order to ensure home supply. In XV. cent. government had already begun to legislate against consumer in interest of producer; corn law of 1436, 1st statute with avowed aim of raising prices allowed exportation when corn fell below fixed price; followed by statute, 1463, forbidding import when prices were below price at which export was permitted. Dearth of wheat, consequent high price and low rate of wages maintained by statute caused permanent discontent of laborers; social reformers of XVI. cent. preached against exploitation of poor consumer in favor of farmer and landlord. Statute of 1436 was re-enacted, 1554, modified, 1562; export, almost prohibited, 1570, again allowed conditionally, 1603. High prices after Civil War compelled reduction of duties, 1663, but system of keeping up prices was subsequently reverted to. Great collapse of prices after Napoleonic wars caused Act of 1815, placing prohibitive duties on imported wheat to relieve agricultural distress and with idea of making Britain self-sufficing in this necessary article. Dearth, 1826, caused suspension of import duty and commencement of Anti-Corn Law agitation; *Anti-Corn Law League* formed, 1838, by Cobden and others; supported by Peel, who passed Bill, 1846, by which corn duties above 1s. ceased, 1849; all duties abolished, 1869.

CORNARO, CATERINA (1454-1510), queen of Cyprus by bequest of husband, James III., who died 1473; Venetian republic compelled her to abdicate, and annexed Cyprus, 1489.

CORNARO, LUIGI (1467-1566), Venetian writer on health.

CORNBRASH, rubbly fossiliferous limestones forming thin band of rocks from Yorkshire to Weymouth, of Bathonian series of Eng. Jurassic formation.

CORNEA. See EYE.

CORNEILLE, PIERRE (1606-84), Fr. dramatist and poet; *b.* Rouen; *s.* of a legal official; ed. for the Bar, but eventually devoted his attention to playwriting, his earlier pieces meeting with little success. His *Medee* appeared in 1635, and met with some acceptance, but *Le Cid* (his masterpiece), produced in the following year, achieved immediate success, notwithstanding the underhand efforts of Richelieu to damn the play. It was followed by *Horace*, 1639; and *Cinna* in the same year; *Polyeucte*, 1640; and *La Mort de Pompee*, 1641. In 1642 appeared *Le Menteur*, a comedy which is the equal of many of Molière's. Other plays produced by him were: *Heraclius, Don Sanche d'Aragon, Andromede, Oedipe, Attila, Tite et Berenice*, etc. He was associated with Molière and Quinault in the writing of the opera *Psyche*, 1671; which contains some of his finest lyrical work. He was the father of Fr. drama; one of the greatest, if not the greatest, of Fr. tragic writers, and a pioneer of Fr. comedy.

CORNEILLE, THOMAS (1625-1709), Fr. dramatist; *bro.* of Pierre C.; wrote about forty plays, including *Ariane, Comte d'Essex, Timocrate*, etc.

CORNELIA (II. cent. B.C.), famous as 'the mother of the Gracchi'; *dau.* of Scipio Africanus.

CORNELIUS, PETER VON (1784-1867), Ger. artist; founder of the modern Ger. school; famous for his frescoes.

CORNELL COLLEGE, educational institution under Methodist auspices at Mt. Vernon, Iowa, organized in 1857. Apart from the usual college courses the institution has departments of civil engineering, music, art, and oratory. In 1923 the institution had an enrollment of 1742 students and there were 47 members on the teaching staff.

CORNELL, EZRA (1807-1874), American business man and philanthropist, *b.* Westchester Landing, New York. He had little early education, and worked as a mechanic. He engaged in the lumber business with his brother, and in 1842 was active in the construction of a telegraph line from Baltimore to Washington. From that time he had devoted himself to telegraph line construction and the organization of telegraph companies, in which work he amassed a large fortune. He was active in Republican politics serving in the state assembly (1862-63), and the state senate (1864-67). He founded and liberally endowed Cornell University.

CORNELL UNIVERSITY, an institution of higher learning, situated at Ithaca, N. Y. Its incorporation dates from 1865 and it was opened to students three years later. Cornell University was so named in honor of Ezra Cornell, who contributed $500,000 to an endowment fund on which the institution was founded. The gift was conditioned upon the assistance of New York State, which at the time had been allotted by the federal government some millions of acres of public lands for establishing colleges of agriculture and of mechanical arts. The donor stipulated that the State apply the proceeds of the sale of these public lands to this object, but that the scope of the university he sought to establish be broadened to embrace a curriculum from which a student could obtain tuition on any subject. The State legislature accepted the gift on these conditions and thus Cornell University came into being as an institution of general learning as well as for the teaching of agriculture and technicology. The charter also provided for free tuition for students living in the State to a number equal to that of the Assembly districts. The annual grant of free tuition goes to 600 students, and a similar privilege is extended to students of agriculture and veterinary medicine.

The university's divisions embrace the graduate department; the colleges of arts and sciences, law, medicine, agriculture, architecture, and civil engineering; the Sibley College of Mechanical Engineering and Mechanic Arts; and the New York State Veterinary College. The college of agriculture is a state establishment. The civil engineering college covers instruction in bridge, railroad, sanitary, municipal, hydraulic and geodetic engineering, while the Sibley College has departments specializing in mechanical, experimental, electrical, marine and railroad mechanical engineering, and in machine design, shop-work, and naval architecture. Hiram Sibley, and his son, Hiram W. Sibley, are notable among the university's many benefactors.

The numerous gifts the institution has received include large sums from the Sage family, spent in adding substantially to its building, equipment and service. John D. Rockefeller contributed the Rockefeller Hall of Physics; A. D., Barnes a Christian Association building; Willard Fiske a library fund of some $500,000; and Oliver H. Payne the Cornell Medical College in New York City. The library contains 655,000 volumes and includes the Zarncke collection, given by Wm. H. Sage, and a priceless historical collection presented by Andrew D. White. Recent additions are a new laboratory of chemistry, under construction in 1921, at a probable outlay of $1,500,000, the gift of George F. Baker, of New York City, and a department of dairy industry, added to the State College of Agriculture, for which the State legislature appropriated $400,000. In 1922 the University had an endowment fund of $18,829,400, a student roll of 5,477, and a faculty numbering 900, headed by L. Farrand LL.D., who was inaugurated president in 1921.

CORNET. (1) During XVI. and XVII. cent.'s was the name applied to the junior officer who carried the colors in a cavalry troop, also to the troop itself, hence 'cornet of horse.' (2) Brass wind-instrument fitted with pistons which, being depressed, either singly or in combination, produce with the natural notes of the tube a complete scale.

CORNETO TARQUINIA (42° 16′ N., 11° 46′ E.), town, Rome province, Italy; occupies site of ancient Tarquinii; has Romanesque church of XII. cent. and a museum of Etruscan antiquities. Pop. 7,500.

CORNFLOWER (*Centaurea cyanus*), blue flower, order Compositæ.

CORNICE, in arch. topmost moulded projection of a column, or wall.

CORNIFICIUS, supposed author of work, *Rhetorica*, written during dictatorship of Marius.

CORNING, a city of New York, the county seat of Steuben co. It is on the Chemung River and on several railroads. It is an important industrial city and has foundries, glass factories, car works, etc. There are coal mines in the vicinity. Pop. 1920, 15,802.

CORNING, ERASTUS (1794-1872), Amer. publicist.

CORNISH BOILERS. See Boilers.

CORN-SALAD (*Valerianella clitoria*) or Lamb's Lettuce, annual plant, substitute for lettuce in France and Italy.

CORNU, MARIE ALFRED (1841-1902), Fr. physicist; improved methods for determining velocity of light.

CORNUCOPIA, 'the horn of plenty,' symbolical of prosperity.

CORNUS (*c.* 40° 7′ N., 8° 32′ E.), ancient city, W. coast of Sardinia; taken by Romans, 215 B.C.

CORNWALL (45° 3′ N., 74° 48′ W.), town, port of entry, on St. Lawrence River, Ontario, Canada; has cotton and woolen mills; celebrated lacrosse club. Pop. 7,000.

CORNWALL (50° 26′ N., 4° 40′ W.); most south-westerly county of England, great promontory, bounded N. and N.W. by Atlantic; E. by Devon; S. and S.W. by Eng. Channel; most southerly point, Lizard Point; most westerly, Land's End; area, *c.* 1,350 sq. miles; 25 miles W. by S. lie *Scilly Islands*, included in C. Scenery is diverse; in W. are broken and picturesque hills and *tors*; remarkable pile of rocks called the Cheese-wring; Cornish moors, bare, dreary, desolate. Long well-wooded valleys descend moorlands with small rivers. The Tamar (bounding C. in N.), Exe, Camel, and Taw are most important rivers. Coast is almost entirely rockbound, with unsurpassed cliff scenery. About 70% of land is cultivated, chiefly oats; large numbers of cattle reared; market-gardening in Pensance district. Most important minerals are tin, mined extensively from very early times (largest mine, Dolcoath), copper, granite, fine slate, and pitch-blende for radium. Principal ports are Falmouth—in large estuary—Penzance and Hayle; important fisheries and brisk coasting trade. C. is exceedingly rich in prehistoric antiquities. Cromlechs called *quoits* are largest and most important known; monoliths, circles, avenues of stone, hut-dwellings, caves, cliff-castles, hill-castles, and ancient Christian crosses, most of these antiquities being near Land's End. St. Michael's Mount, with castle (1047) on its summit, is a granite rock in Mount's Bay, not far from Penzance. Pop. 1921, 320,559.

CORNWALL, EARL OF, RICHARD PLANTAGENET (1209-72), 2nd *s.* of King John; commander-in-chief of Crusaders, 1240-41; elected king of the Romans, 1256, but speedily overthrown.

CORNWALLIS, CHARLES, FIRST MARQUESS (1738-1805), Brit. general; with his surrender, of Yorktown, 1781, Amer. War of Independence ended.

CORNWALLIS, SIR WILLIAM (1744-1819), Brit. admiral; served under Hood and Rodney, and distinguished himself in wars against Fr. Revolution; vice-admiral, 1794; admiral, 1799.

CORN WEEVIL. See INSECT PESTS.

CORO (11° 23′ N., 69° 40′ W.), city Venezuela, near Bay of C.; important commercial center for coffee, hides, tobacco, timber, and dyewoods. Pop. 9,000.

COROLLA. See FLOWER.

COROMANDEL COAST, a name given to eastern coast of India, between Cape Calimere and the mouth of Kistna river.

CORONA (astron.), luminous envelope round the sun outside the chromosphere, only observable during total solar eclipses; C. borealis and australis, constellations in N. and S. hemispheres; (meteor.) halo round the moon or sun due to diffraction by particles of moisture or dust; (arch.) projecting part of cornice, protecting the wall from weather; (bot.) appendages on inner side of corolla of flowers like daffodils and jonquils.

CORONACH, Gaelic dirge for the dead in Scot. Highlands; known in Ireland as 'keening.'

CORONADO, FRANCISCO VASQUEZ DE (*c.* 1500-*c.* 1545), Span. discoverer; in 1540-42 led Span. force to explore New Mexico, and made settlements in Kansas.

CORONATION (O. Fr. from Lat. *corona*, crown), ceremony of crowning sovereigns as symbol and consummation of investiture with rule. Rom. emperors received no crown at accession owing to faint lingering of republican feeling. Barbarian states which grew up on ruins of Rom. empire retained, until Christianized, Teutonic custom of elevating ruler on shield, bearing him thrice round assembled tribes, placing spear in his hand and fillet ('diadem') round his head: Eng. c. procession, etc., and practice under Fr. monarchy of showing king to people, are relics of this custom. Mediæval and modern anointing and crowning are derived from *Old Testament* through Christian Church. Service set forth in *Liber Regalis* was followed in England at c. of Edward II. and until Reformation; translated and retained with exception of substitution of communion service for Mass; modified, 1685, and considerably changed, 1689; since shortened.

CORONEL, BATTLE OF. On November 1, 1914, Rear-admiral Cradock, with a British naval squadron comprising the armored cruisers Good Hope (flagship) and Monmouth, the light cruiser Glasgow, and the armed liner Otranto, encountered a powerful Ger. squadron under Admiral von Spee, composed of the armored cruisers Scharnhorst and Gneisenau and the light cruisers Nürnberg, Leipzig, and Dresden, off Coronel on the coast of Chile (36° 25′ S., 73° 45′ W.). The action opened at 7 p.m. at a range of 12,000 yds. in a rough sea, and took the form of a running fight to the south. By 7.35, when the range was 5,500 yds., Good Hope was burning fiercely; a great explosion took place shortly afterwards and the vessel began to settle down. Monmouth was also on fire, and turned to the westward, followed by Nürnberg. The Brit. ship refused to surrender and went down with her flag flying. The Ger. squadron bore down upon Glasgow, which, however, effected a miraculous escape, Otranto having made off at an earlier stage. They succeeded in joining Canopus on the following day.

CORONER, important civil officer whose duty is to inquire into the cause of death of any person suspected of having come to a violent, or unnatural end. He holds office by vote; must be a 'fit person,' but not necessarily a medical man.

CORONIUM, element in sun's corona, with characteristic green spectroscopic line.

COROT, JEAN - BAPTISTE CAMILLE (1796-1875), Fr. artist; one of the most individual and poetical of landscape painters.

CORPORAL, non-commissioned military officer, below sergeant; 'ship's c.' is petty officer under master-at-arms.

CORPORATION in law consists of two kinds—sole and aggregate. A. c. *sole* consists of one person, the holder of a public office, and his successors, (*e.g.*), abp. or vicar. A c. *aggregate* is a society of persons authorized to act as one person. A corporate body must always bear a corporate name by which it sues and is sued, and it must possess a common seal to be applied to its legal documents. It can inherit property, and hold it in perpetuity, being unaffected by the death of its individual members, if only care be taken to fill vacancies according to its constitution.

CORPORATION TAX. See TAXATION.

CORPS. See ARMY.

CORPULENCE, OBESITY, abnormal accumulation of fat in the body under the skin or around certain of the organs where normally there is a certain small amount of fat. The condition is often hereditary, and also due to habits of over-feeding or over-drinking.

CORPUS CHRISTI, a city of Texas in Neuces co., of which it is the county seat. It is on Corpus Christi Bay, at the mouth of the Neuces River, and is on the Mexican National, the St. Louis, Brownsville and Mexico, and other railroads, 145 miles southeast of San Antonio. It is surrounded by an important stock raising and agricultural community and has also important fishing and oyster packing interests. There is a Catholic convent and several churches. Pop. 1920, 10,522.

CORPUS CHRISTI, FEAST OF, (*i.e.*), feast of the Body of Christ, on first Thursday after Trinity; observance enjoined by R.C. Church in XIII. cent. in connection with doctrine of transubstantiation.

CORPUSCLES. See BLOOD.

CORREA, genus of Australian evergreen shrubs cultivated in gardens.

CORREA, DA SERRA, JOSE FRANCISCO (1750-1823), Portug. scientist and politician.

CORREGGIO, ANTONIO ALLEGRI (1494-1534), Ital. artist, head of the Parma school of painters; distinguished by wealth of invention, boldness of design, clever treatment of light and shade; unequalled in flesh-painting; works mostly executed at Padua, Parma, and at Correggio, whence he derived his professional name. Padua and Parma have still some of his magnificent frescoes.

CORRENTI, CESARE (1815-88), Ital. revolutionary politician.

CORRESPONDENCE SCHOOLS, institutions which afford instruction through the mails. They had their origin in the university extension instruction first practiced in England, in 1868. In 1883 Cornell University instituted a similar practice for the benefit of students who could not attend classes in person. Aside from this particular instance, the stimulus came from William R. Harper, President of the Chautauqua Institute, which instituted courses in varied subjects, which were abandoned, however, with the growth of special correspondence schools throughout the country. There is hardly a subject at the present time which may not be the subject of study through correspondence, instruction being offered in some cases by firms bordering closely on the fraudulent, ranging from wrestling to poultry raising. The larger institutions of this sort, however, offer a genuine advantage to those persons who not only find it impossible to give up their whole time as resident students of educational establishments, but who have only their evenings to devote to study. One of the most important of the many correspondence schools in the United States is the International Correspondence Schools of Scranton, Pa., which offers several dozens of courses, usually of a technical nature. It has thousands of students, not only in this country, but in all parts of the world. The method of instruction does not differ materially from the oral method. The student, on enrolling, receives special text books, which he studies at his leisure. Sets of questions are then presented, which he must answer, as at any examination. These examination papers are then sent to the headquarters of the school, where they are corrected with marginal notes, and returned to the student, who profits by the corrections. Special questions may then be asked in writing, which are answered, sometimes by the teacher by special letter, or, in the case of questions commonly asked, by printed slips. A final examination is then held, when the course is completed, and the percentage of correct answers to questions then determines whether the pupil has passed and earned the diploma, granted by practically all of these schools. Under this system it is, of course, possible for the student to cheat, but in such a case he injures himself only. Usually the students are adults and past the age where cheating is practiced. There is no doubt that thousands of young men throughout the country have found in the correspondence schools a means to elevating themselves in position, especially in the technical professions. This is probably more true of the United States, where solid ability counts for more in advancement than degrees from educational institutions.

CORRÉZE (45° 20′ N., 1° 45′ E.), department, Central France; formed from southern part of old province Limousin; surface hilly and mountainous; chief rivers, Dordogne, Vezere, and Corréze; soil poor; climate variable; coal, iron, granite, wine, and timber; agriculture and cattle-raising; capital, Tulle. Area, 2,273 sq. miles. Pop. 1921, 273,808.

CORRIB, LOUGH, lake, W. Ireland, in counties of Galway and Mayo; drains by river Corrib to Galway bay; length, 27 miles; extreme breadth, 7 miles.

CORRIENTES (28° S., 58° W.), province, Argentine Republic, S. America, between rivers Paranã and Uruguay; forms vast plain; northern districts largely covered by swamps and lagoons; exports include timber, cotton, tobacco, cattle, and horses. Area, 32,580 sq. miles. Pop. 1921, 371,815. Capital is Corrientes, on Paranã; port and commercial town. Pop. 28,500.

CORRIGAN, MICHAEL AUGUSTINE (1839-1902), American Roman Catholic archbishop, *b.* Newark, N. J. He graduated from Mount St. Mary's College and was the first American student to enter the American College at Rome. In 1864 he began his work as a priest in the Newark diocese; was shortly afterwards made professor of dogmatic theology at Seton Hall Seminary, South Orange, N. J., and in 1868 became president of that institution. He became bishop of Newark, in 1873 and seven years later was made coadjutor to Cardinal McCloskey, archbishop of New York. The latter office was conferred upon him when the Cardinal died in 1881. This position he held to his death. His learning and character made him a powerful figure in his church and in the community.

CORROSION. See METALS.

CORROSIVE SUBLIMATE, MERCURIC CHLORIDE ($HgCl_2$), white small rhombic crystals, fairly soluble in hot water; M.P. 288°, B.P. 303°; powerful poison and antiseptic.

CORRUPT PRACTICES, a term especially applied to corruption in political elections. This has been one of the inherent evils of the development of political democracy, and has been one of the features of elections in all democratic countries. In the younger, untrained countries it usually takes the form of violence, or threats of violence, as in Bulgaria, which in 1879 was launched with a constitution giving it one of the most democratic forms of government in Europe. For many years the elections at the polls amounted to little short of pitched battles between the rougher elements of all the contending parties, the candidates elected being usually those supported by the party in power, which employed the police force as a coercive element. In England, where the transition to democratic government was more evolutionary, such abuses have never been so pronounced, yet already in 1854 Parliament found it necessary to pass the Corrupt Practices Act, directed against the buying of votes, if not always by means of money transactions, then through economic pressure, as in the case of men employed by candidates or their friends. Corruption in politics in the United States have perhaps never been so violently flagrant as in countries like Bulgaria, but they have gone on practically unchecked until within the past two or three decades. Here the cause has not been on account of any sudden transition from autocracy to democracy within the country, but because of the sudden entrance into the country of illiterate persons used to autocratic government during the earlier parts of their lives, which amounts to the same thing so far as the electorate is concerned. Therefore corruption has been most pronounced in large cities where immigrant elements were a majority of the population. The cure is probably in a growing sense of responsibility on the part of the masses of the people, brought about through years of enjoyment of the privileges of democracy. Unfortunately, this tendency has been much retarded in this country by the continued stream of immigration, especially from the backward countries of southern Europe. Legislation is rather an indication of growing public sentiment than an actual prevention, but as such is instructive. New York passed its first laws against corrupt practices in 1890, in which candidates were required to file statements of their campaign expenses. Since then other states have followed this example. A number of states prohibit electioneering on election day. Oregon pays part of the election expenses of all party candidates. Massachusetts forbids the publication or circulation of electioneering notices or advertisements without responsible signatures, and has passed laws against subsidizing newspapers. Colorado allows twenty-five cents per vote cast to each party, basing this subsidy in each campaign on the votes cast during the previous elections. This money is paid to the state chairmen, who is compelled to distribute it among county chairmen and render account. In 1911 Indiana passed a law compelling electoral campaigns to be superintended for each party by paid, responsible agents. Some Federal legislation has also been passed with the same purposes in view. In 1907 a law was passed by Congress forbidding corporations to contribute to campaign funds, the corruption from this source in the election of President McKinley having roused public sentiment. In 1910 another act was passed compelling publicity of contributions, also limiting the campaign expenses of a candidate for Congress to $5,000.

CORRY, a city of Pennsylvania, in Erie co., on the Erie and Pennsylvania Railroads. It is an important industrial city and has manufactures of steel, machine shop products, flour, locomotives, and gas engines, shovels, toys, etc. It is the site of the State Fish Hatchery. There is a handsome public school and other important public buildings. Several mineral springs and petroleum wells are in the neighborhood. Pop. 1920, 7,228.

CORSAIR, Barbary sea-rover of former days, authorized by Saracen government.

CORSET. See Costume.

CORSICA (Fr. *Corse*), isl. belonging to, and dep. of, France (42° 11′ N., 9° E.); separated from Sardinia in S. by Strait of Bonifacio; over 100 m. long and 50 m. broad; E. coast is exceedingly regular, but W. deeply indented by series of gulfs; interior is mountainous; chief summits—Cinto (8,800 ft.), in N.W.; Rotondo (8,000 ft.), in center. A large plain, fertile but marshy, extends from E. coast to foot of mts. Immense tracts of splendid forests—notably of chestnut trees and olives—have been reduced. Higher up are Alpine pastures with many sheep and goats. Most important agricultural products are grain, olives, wines, fruits (notably lemons), and potatoes; timber is largely exported; important fisheries, also coral fishing; several small lead, copper, and antimony mines; minerals include granite, porphyry, jasper, serpentine, alabaster, and marble. Climate is salubrious, except on E. coast, where the plain is malarious. Cap. is Ajaccio; other ports, Bastia and Calvi. Corsica is an important torpedo station of Fr. navy. Pop. is almost entirely Italian; vendetta still practiced. Isl. was colonized by Phocæans, then by Phœnicians (6th cent. B.C.), and in 3rd cent. B.C. Romans superseded Carthaginians; invaded by Vandals (A.D. 456), Goths, Saracens (852), and Lombards; for a time part of Frankish kingdom; passed to Pisans (*c.* 1100); after long struggle, mastered by Genoese (*c.* 1350), who sold it to France in 1768; temporarily liberated by Paoli, and occupied by British (1793-6); restored to France (1815). Napoleon was a native of Corsica. During Great War afforded asylum to Serbian refugees. Area, 3,367 sq. m. Pop. 288,800.

CORSICANA, a city of Texas, the county seat of Navarro co. It is on the Houston and Texas Central and other railroads, 180 miles northeast of Austin. It is the center of an unusually important oil region. Among the institutions of the city are a State orphan's home, and the Odd Fellows widow's and orphans' home. Pop. 1920, 11,356.

CORSINI, family of Florentine nobles, dating from XII. cent.

CORT, HENRY (1740-1800), the inventor of 'puddling' 1784; also contrived a method by which puddled balls of ore were rolled into bars; became involved in lawsuits, and finally received a government pension.

CORTE (42° 17′ N., 9° 9′ E.), town, Corsica; seat of Paoli's government in XVIII. cent.; marble quarries. Pop. 5,500.

CORTELYOU, GEORGE BRUCE, (1862), American public official and financier. Graduated from Hempstead, L. I. Institute 1879; LL.B., Georgetown University, 1895; George Washington University, 1896; (LL.D., George town, 1903, Kentucky Wesleyan, 1905. University of Illinois, 1905.) General law and verbatim reporter, New York, 1883-5; Sec. of Dept. of Commerce and Labor, Feb. 16, 1903-July 1, 1904; Sec. of the Treasury, March 4, 1907-March 8, 1909 in cabinets of Pres. Roosevelt. Pres. of Consolidated Gas Co. of N. Y. since 1909.

CORTE-REAL, JERONYMO (1533-88), Portug. epic poet.

CORTES, HERNANDO (1485-1547), Span. Conquistador; took charge of colonists sent to Mexico (*q.v.*), 1519; founded Vera Cruz; was worshipped as god by subjects of Montezuma, emperor of Mexico; seized Montezuma and finally subdued Mexico, 1521; granted by Charles V. large province with title of marquis; discovered Lower California, 1536; *d.* in disgrace. C. was an important extender of Span. colonial empire.

CORTES, name given to Span. Parliament; composed of Senate and Congress, of equal authority. Senate consists of (1) hereditary senators; (2)

life senators nominated by Crown; (3) senators elected by people. Members of Congress are elected by people, and their number is in proportion of one member to 50,000 people. Portug. legislative chambers are also called the Cortez.

CORTISSOZ, ROYAL, Literary critic; Author of *Augustus St. Gaudens*, 1907; *John La Farge*, 1911; *Art and Common Sense*, 1913. Editor of Don Quixote, The Autobiography of Benevenuto Cellini; Whitelaw Reid's American and English Studies. Member National Institute of Arts and Letters.

CORTLAND, a village of New York, in Cortland co., of which it is the county seat. It is on the Lackawanna, the Lehigh Valley and the New York Central Railroads, and on the Tioughnioga River, 37 miles south of Syracuse. It is the center of an important agricultural region and has also large industrial interests, including wire works, foundries and machine shops, and manufactures of carriages, stoves, harness, cash registers and steel ware. Cortland is the site of the State Normal School. It has a courthouse, banks, etc. Pop. 1920, 13,294.

CORTONA, a town, and episcopal see of Italy, in the prov. of Arezzo, 69 m. S.E. of Florence. It is surrounded by the ancient Etruscan walls, still in fair preservation, and is one of the oldest cities of Europe. A mediaeval castle, the highest point of C., stands 2130 ft. above sea-level. There is a cathedral dating from the 11th century, and restored in the 18th century, which contains pictures by Luca Signorelli, a native of the town, 1441. There are also old churches with paintings by Fra Angelico, Pietro da Cortona, and others. The museum contains many Etruscan curiosities.

CORUMBA (19° S., 57° 20′ W.), fortified town and port, on Paraguay, Brazil, S. America. Pop. 10,000.

CORUNDUM (Al_2O_3), the hardest mineral except the diamond, occurring in several varieties—the ruby, sapphire, Oriental amethyst, topaz, emerald. Common c. is found in grains in sand (India), and in igneous rocks in U. S., and is used for bearings in watches and scientific apparatus, and for grinding. Emery is impure c. See ABRASIVES.

CORUNNA, CORUÑA (43° 22′ N., 8° 25′ W.), fortified seaport, capital of C. province, Spain, on small bay, N.W. coast; commodious harbor; has two old churches (XII. and XIII. cent.), two hospitals, arsenal, barracks, cigar factory; sailing port of Armada, 1588; burned by English under Drake, 1598; scene of battle, Jan. 16, 1809, in which Sir John Moore fell after defeating the French; exports wine, fish, and agricultural produce; imports coal and manufactured goods. Pop. 61,000

CORUNNA, CORUÑA (43° N., 8°. 30′ W.), N.W. province, Spain; bounded N. and W. by Atlantic Ocean; district is mountainous and generally fertile; extensive fisheries; chief exports—farm produce, fish; area, 3,051 sq. miles. Pop. 691,000.

CORVÉE, unpaid labor due from tenant to noble in feudal times; tax in form of compulsory labor (road-making, etc.).

CORVEY, ancient Benedictine abbey, on Weser, 1 mile N.E. of Höxter, Westphalia, Germany; founded 228; first occupied by monks from Corbie in Picardy.

CORVUS, MARCUS VALERIUS (370-270 B.C.), Rom. general.

CORWIN, THOMAS (1794-1865), an American statesman, *b.* in Bourbon co., Ky.; admitted to the bar in 1817. Served in the Ohio Legislature and the National House of Representatives; was governor of Ohio (1840-42), and served in the U.S. Senate. In 1864 he was minister to Mexico. He was chairman (1860) of the Committee of Thirty-three to consider measures for reconciling the North and South.

CORY, WILLIAM JOHNSON (1823-92), Eng. poet; *Ionica*, 1858.

CORYBANTES (classical myth.), attendants upon Rhea, mother of Zeus, and associated with her orgiastic worship.

CORYPHÆUS, chorus-leader in Gk. drama.

COS, STANCHIO (36° 50′ N., 27° 10′ E.), island Ægean Sea, W. of Asia Minor, belonging to Greece; surface partly mountainous, partly fertile and well cultivated; fine climate. Chief town, Cos (pop. 4,000), on N.E. coast, near site of temple Æsculapius; small harbor; birthplace of Appelles, Ptolemy Philadelphus, and Hippocrates; exports wine and raisins. Pop. 10,000.

COSA, ancient city, Etruria, S.W. coast of Italy.

COSEL, KOSEL (50° 20′ N., 18° 10′ E.), town, on Oder, Prussian Silesia, Germany; tanneries. Pop. 8,000.

COSENZA (39° 19′ N., 16° 17′ E.), town (and province), Italy, at junction of Crati and Busento; has a Gothic cathedral, a fine courthouse, and a ruined castle; trades in wine, oil, silk, etc.; in XVI. cent. was center of persecution by Inquisition of the Waldenses. Pop. 27,000.

COSGRAVE, WILLIAM T., an Irish public official, *b.* in Dublin, where for many years he was engaged in business. In 1909 he became a member of the Irish Republic Brotherhood, and in the same year entered politics. He was elected to the city council and from that time remained a member of the Dublin Corporation. He took a leading part in the Sinn Fein Society up to the time of the rebellion of 1916, although he was not recognized as a leader. He participated in the rebellion and was captured and placed on trial, May 5, 1916. He was sentenced to penal servitude for life and remained in prison until the general amnesty of 1917, when he was released. In the autumn of that year he was elected to Parliament on the Sinn Fein platform, and soon afterward was made Treasurer of the Sinn Fein. He was again arrested in May, 1918, and was deported to England, where he remained until March, 1919. when he returned to Dublin. His power now increased steadily and as treasurer and chairman of the financial committee of the Sinn Fein, he had great influence. He was again arrested and deported in March, 1920. In spite of his continued opposition to British rule, his influence was moderate. On his return to Ireland he became minister of local government in the Sinn Fein Parliament and assisted Arthur Griffith in his constructive policies. On the establishment of the government of the Irish Free State, he was appointed president of the Irish Parliament, in September, 1922.

COSHOCTON, a city of Ohio, in Coshocton co., of which it is the county seat. It is an important industrial city and has a large trade with the surrounding country in coal, grain, flour, wool, etc. Pop. 1920, 10,847.

COSMAS, INDICOPLEUSTES (VI. cent. A.D.), noted traveler of Alexandria who upheld Ptolemaic theory of geographical configuration of earth.

COSMATI, Rom. family of craftsmen noted in XIII. cent.; their architecture, sculpture, and mosaics can be seen in many churches at Rome.

COSMETICS (Gk. *kosmeo*, I adorn), the word applied to all chemical preparations used for improving the appearance of skin and hair. Face powders consist of zinc oxide, French chalk, and orris root, finely powdered and perfumed. Some C. are comparatively harmless, while others are more or less poisonous, and dangerous to use. Hair C. are composed of lard and white beeswax, to which is added a suitable perfume.

COSMIC, relating to the universe. Cosmic physics is applied to the wider issues of astrophysics, including terrestrial phenomena.

COSMOGONY, term designating theory regarding origin of the universe; Jewish account found in *Genesis* I is paralleled by Zoroastrian conception of creation on basis of mere volition of supreme deity; Egyptians thought universe sprang from egg; Greeks ascribed world to work of Creator, but Lucretius (*q.v.*), the most advanced Rom. cosmogonist, advanced an atomic theory. In modern times there is a strong tendency to admit or waive belief in original guiding power, but to explain actual creation scientifically. In Nebular Theory, supported by Kant, Herschel and others laid stress on rotation of earth and stars to suggest probable formation. The question is still open to speculation.

COSMOS. See COSMOGONY.

COSNE (47° 26′ N., 2° 58′ E.), town, Nievre, France; has woolen mills and iron manufactures. Pop. 6,000.

COSSA, LUIGI (1831-96), Ital. economist.

COSSA, PIETRO (1830-80), Ital. dramatist; wrote tragedies on classical subjects and Ital. history.

COSSACKS (*Kazaku*), a name, Turkish or Kirghiz in origin, signifying 'freebooters,' applied to certain military communities of the former Russian Empire, who furnished the best light cavalry of the Russian army. They were organized in ten *voiskos* (Don, Volga or Astrakhan, Ural, Kuban, Terek, Orenburg, Siberia, Semiryechensk, Amur, and Usuri). The unit of Cossack life is the *stanitsa*, or village commune. Nomadic tribes, they began about the 16th cent. to appear as a settled people in the lower Don basin, and soon afterwards are found on the Dnieper. Sigismund I. of Poland granted some of them lands on the lower Dnieper, 'below the cataracts'; hence the name Zaporogian Cossacks. Stephen Bathori (1575-87) gave the Dnieper warriors (Cossacks of the Ukraine or 'frontier') a regular organization under an *ataman* or *hetman*. In 1792 the Cossacks of the Kuban (Black Sea) were formed, and other lines were subsequently established on the lower Volga, Terek, Ural (river), in W. Siberia, Transbaikal, etc. During the World War there were nearly half a million Cossacks in the ranks, and they played a prominent part, especially in the invasion of Galicia. Although they had been long an immovable pillar of Russian autocracy, they were not hostile to the revolution of 1917. Under the Bolshevist regime the Don Cossacks formed an independent republic. See Russia.

COSTANZO, ANGELO DI (1507-1591), Ital. historian and poet; wrote valuable history of Naples; lover of Vittoria Colonna.

COSTA RICA, republic of Central America (10° N., 84° W.), stretching from sea to sea, and bounded by Nicaragua and Panama; cap. San José; area, *c.* 23,000 sq. m. The country is generally mountainous, with many volcanoes; earthquakes frequent; coast is flat, with dense lands on Atlantic slopes. Principal products are coffee and bananas. Other exports include cocoa, tortoise, shell, and hides. New rubber plantations are proving productive. Costa Rica yields valuable timber—dye-woods, cedar, mahogany, fustic, etc. Sugar and rice are cultivated. Gold is mined in places; silver, copper, and other metals also found. It is divided into seven provinces. There are *c.* 3,500 aborigines; religion, R.C. Costa Rica (Rich Coast) was taken by Spaniards early in 16th cent. It revolted against Span. rule, and became an independent state (1821); formed part of Confederation of Central America (1824-9); now governed by president and Congress. In May 1910 an earthquake destroyed city of Cartago. Pop. *c.* 455,000. See Pan-American Union.

COSTERMONGER, itinerant street trader; corruption of 'costard-monger,' seller of 'costard' apples.

COST-KEEPING, a system which has been developed greatly of recent years, particularly in U.S., owing to increased necessity to manufacturers of knowing exactly what each article or class of articles costs. Formerly costs were taken from estimates in which many items of expenditure were overlooked; but in most modern factories every penny of expenditure is analyzed and apportioned to particular work for which it was incurred. Under this system the cost of labor and material on a job are summed, and to this total is added a percentage, carefully calculated, to cover management, light, heat, depreciation, and other general expenses which cannot be specifically apportioned to particular jobs. Cost systems involve much clerical work, and therefore expenditure, but experience has shown that most businesses, even though comparatively small, benefit by the adoption of some such system, modified to suit the particular requirements.

COSTS, legal term for expenses incurred, and for professional help given by a lawyer to client.

COSTUME (mediæval Lat. *costuma*, from Lat. *consuetudo*, 'custom'), term which meant at first any fashion, but in modern use is only applied to personal clothing and adornment. The motives of wearing clothes for ornament and as a protection for the vital parts seem to be coeval, although, as ornament requires less apparatus of civilization than clothes, even skins, tattooing, etc., probably preceded the primitive loin-cloth; the idea of decency seems only to be evolved by age-long covering of the body. The loin-cloth, tied in front, was worn by the ancient Egyptians. It was succeeded by a close-fitting, frock-like garment reaching below the knees, leaving both arms free, and the right shoulder uncovered. The Babylonians wore a short skirt suspended from the waist, leaving the upper portion of the body exposed, a style of dress also adopted by some of the Egyptians. A later development amongst these Eastern peoples was a close-fitting, embroidered garment reaching down to the ankles, often with sleeves, but sometimes without. The foot-wear consisted of sandals. The hair was generally full and long, and often confined with a fillet. The earliest kind of headgear was a close-fitting circular cap; this was succeeded by a high conical bonnet, sometimes with ear-flaps.

Greek.—The Gr. men of the Mycenæan age wore the loin-cloth, but the women developed a complete dress with flounced lower part. The most characteristic garment of the succeeding Greeks was the *peplos*, or 'Doric dress,' a large square of cloth, folded, and fastened on the right shoulder with a brooch; the waist was generally encircled by a girdle through which the long folds might be drawn up to prevent trailing, giving a characteristic overlap. Another garment of importance was the Ionian *chiton*, a close-fitting linen shift or tunic, which in some cases reached only to the knees, but generally to the feet. The *pallium*, a loose mantle, is also found. Peasants' and herdsmen's garments were of sheepskin or leather. Sandals were the usual footwear; high boots were favored for traveling and the chase. Much use was made of rings, bracelets, necklaces, brooches, and earrings of precious metals, enamel, or bronze, and jeweled.

Roman dress differed little from the

Greek. The Etruscan sarcophagus in the Brit. Museum shows the Ionian dress; the *subligaculum*, or loin-cloth, was early superseded by the *tunica*, similar to the Gr. *chiton*, which became the everyday wear of both sexes, but later only of men. The *toga*, full-dress garment for special occasions, was in early times the habit both of men and women. It was a large, almost circular, piece of woolen cloth, draped round the form similarly to the *peplos*, with one end thrown over the left shoulder and fastened by brooch or girdle. Both the *tunica* and *toga* were, as a rule, plain white, but stripes of purple and scarlet marked the rank of senators and others. An embroidered *tunica* and purple *toga* were adopted by Julius Cæsar as the permanent imperial costume. Women abandoned both *tunica* and *toga* for the *stola*, a long tunic with ornamental border and neck; at first sleeveless. Cloaks were worn in bad weather, sometimes with hoods. Sandals and shoes and high boots of red or black leather, according to rank, are found as in Greece. Hats were not used; hair was dressed in the Gr. fashion; jewelry was worn by both sexes.

Ancient British.—When Cæsar landed on the shores of Britain he found the more uncivilized tribes clad in skins; they are said to have smeared their bodies with woad. But the inhabitants of Kent wore striped or checkered frocks, or kilts, so that their dress was very similar to the Highland costume, which is still called 'the garb of Old Gaul.' Their winter garments consisted of dyed tunics, close-fitting *bracoe*, or trousers, which now make almost their first appearance, and short cloak (*sagum*). The female dress may be judged from Dio Cassius's description of Boadicea, who wore her light hair flowing about her shoulders; was clad in a dyed tunic, over which was draped a coarse robe, fastened with a *fibula*. The Druids wore full robes of white; the Bards, blue; the Ovates (medicine-men and astronomers), green. Later the Brit. chiefs adopted the Roman habit; and the women assumed a long under-tunic reaching to the feet, and a short outer one, with loose half-sleeves.

Anglo-Saxon and Anglo-Danish.—The dress of the Anglo-Saxon kings and leaders was a plain tunic, short cloak, fastened with a *fibula*, long hose, drawn up over short trousers, and cross-gartered. Better-class women wore a long gown with loose sleeves, over which a super-tunic was worn. The ordinary dress was a linen shift and plain gown for women; tunic and belt for men. Cloaks and caps were for bad weather; all wore shoes, except slaves, who went barefoot. As regards eccles. dress, the costume of an archbishop of this period consisted of chasuble, pall, dalmatic, stole, and alb. With the coming of the Danes little change took place. Their favorite color was black; their national emblem, the raven. Later they adopted tunics of white linen or colored cloth, and sometimes furred mantles.

Norman and Plantagenet.—There was practically no change in the habits of the people under the rule of William the Conqueror. Under William II., however, extremes of fashion set in; men began to wear long cloaks, trailing gowns with loose sleeves, and fantastically pointed shoes. The women effected a tightly-laced bodice, and a gown with hanging sleeves. The laboring class still kept the loose tunic, cloak pinned at the shoulder, caps, brimmed hats, and flat bonnets. The *dalmatic*, a wide-sleeved, lengthy gown, became the regal costume under Henry I., and remained so through several reigns. Henry II. introduced the short Angevin mantle; rich furs began to be popular with the wealthy classes, and the long gowns, though of simple design, were made of cloth of gold and rich damasks. Under Edward III. (1327-77) great changes took place. Amongst the nobles the long robes and tunics gave place to the long hose and *cote-hardie*, a close-fitting garment reaching to the mid-thigh, and buttoned down the front, with half-sleeves, to display the long sleeves of an under-vest. This was worn by both sexes. The use of furs and the more expensive cloths was regulated by rank and wealth. Ermine was the royal fur, while few of the nobility were permitted other than miniver. The *Order of the Garter* was instituted in this reign. In place of the *cote-hardie*, women sometimes wore a short spencer-jacket, edged with fur, according to rank. Sartorial luxury made many steps forward under Richard II., the greatest fop of his day. Parti-colored costumes were introduced as early as the reign of Edward II., but under Richard II. they became the prevailing fashion. It was during this reign, too, that the long, pointed shoes, called *crackowes*, reached ridiculous length, and were fastened about the knees with chains.

Tudor.—With the accession of Henry VII. a much simpler style of costume became the vogue. Henry himself wore a simple, short furred gown, long hose, and flat, wide cap. Shoes were very broad-toed; embroidered lawn shirts became popular, and to display these the slashing of doublets and hose became fashionable. Women wore gowns cut square at the neck, with stomachers and rich girdles, from the front of which hung long pendants. The waistcoat is first mentioned during Henry's reign, and was then a sleeved garment, like that worn by the railway porter of the present day. Under the Stewarts and Georges the waistcoat reached to the knees. In Elizabeth's time the upper-stocks developed into 'trunk hose'; the doublet was deprived of its skirts, and took the shape of a peascod; the shirt, with embroidered neck, gave place to the ruff, the flat cap to the conical hat. The characteristic feminine garments were the enormous starched tiers of ruff and frill (imitated by men) round the neck, the stomacher, and the Span. farthingale introduced by Mary and now become immense.

These fashions were pretty constant under the Stewarts. Puritan influence was directly small, but indirectly may have helped to refine fashionable taste. The grotesque ruff gave place to deep 'Vandyke' collars of lace, and many Elizabethan distortions were succeeded by really becoming modes. The plumed Cavalier, however, loved to emphasize the difference between himself and the Roundhead in his simple apparel of sober color. In the reign of Charles II. 'petticoat breeches,' worn for some time in France, were a common mode; they were wide, puffed, be-ribboned garments, tapering down to just above the calf, where they were fastened; high-heeled shoes and steeplechase hat with coronal of feathers are characteristic of the courtier of this period. Women's bare shoulders sloped down beneath ringlets to a short, tight bodice, which expanded at the high waist into the amplitude of a slightly hooped skirt. Collars over the shoulders had become usual by the close of the century, when the long waist and even the stomacher had reappeared.

Georgian dress for men shows knee-breeches appearing slightly below 'three-quarters' coat, buttoned with many buttons, without collar, and with deep, wide cuffs; under the coat is the waistcoat on which much fancy was expended, surmounted by the long, soft cravat; shoes, usually square-toed, were adorned by buckles which were an important feature. The hoop of women's dress had attained immense size by the middle of the century. The classical influence of the French Revolution brought in, on the contrary, clinging robes, sometimes damped in order to show the limbs, the high 'Empire' waist, sandals, etc., and had an important permanent effect in an ideal of simplicity of fashion.

Men's dark-colored clothes, which became usual in the 19th cent., are perhaps ascribable to the continued mourning worn in Europe through the slaughters of the Napoleonic wars, but black was a favorite color of Beau-Brummell. The frock-coat, waistcoat, and top-hat from which the present articles are derived, are first to be seen in the arbiter of taste. Count d'Orsay, although his lightly starched linen neckcloth, rising to the ears and almost engulfing the chin, has given way to the narrow, stiffly starched variety.

Linen shirts were worn by both sexes from a time preceding the Conquest, poor folks wearing coarse canvas, or dowlas. In the days when silk stockings were the fashion, three pairs were often worn in cold weather; and false calves were by no means uncommon. Folding fans have been in use since the days of Elizabeth. The woman's modern *blouse* was copied from the famous Garibaldi Red Shirt (*c.* 1846). The *crinoline* was first worn in 1856. The *petticoat* was originally a man's outside coat, later an under-tunic, and a 'petticoat of red damask' was worn by Henry V. 'An apron' is a corruption of 'a napron.' A 'bodice' is a corruption of 'bodies,' stays being originally called a 'pair of bodies.' Men's loose collars were introduced about half a century ago. The evening, or 'swallow-tail,' coat is merely a 'cut-away' garment developed from the frock-coat. The 'trews,' or tartan trousers, are an essential part of the Highland dress, and were worn by 'Prince Charlie.' Baggy 'Cossack' trousers were first worn in England about 1816, but tight-fitting trousers continued in favor for long afterwards. In the earlier years of the 19th cent. the wig became rare: and the soldiers abandoned their pigtails in 1808. The first umbrella used in England was in 1750, but it was not generally adopted until about a quarter of a century later. The first silk 'top-hat,' as the successor of the 'beaver-hat,' was seen in London in 1797. In matters of costume fashion revolves in cycles, and tends to change with more and more rapidity. For many centuries Paris, on account of dainty and artistic inventiveness and imagination, set the fashion in women's clothes to Europe, and Vienna, London, and New York were also leaders of opinion in this matter. For men's clothes the fashion is largely set in London.

CÔTE D'OR (47° 30′ N., 4° 40′ E.), department, E. France, formed of part of old province of Burgundy; surface elevated and well wooded in N.; chief rivers, Seine, Saône, and Armançon; good pastures; important vineyards; famous Burgundy wines produced; fertile valleys and plains; chief industries, sheep and cattle rearing; iron and steel manufactures; capital, Dijon. Area, 3,392 sq. miles. Pop. 1921, 321,088.

COTENTIN, THE, peninsula (length, *c.* 55; breadth, *c.* 26), formed by Bay of St. Michel and Gulf of Carentan, France; fertile and good pasture ground for cattle; in mediæval times was owned by Dukes of Normandy; is now part of department of La Manche; chief town, Cherbourg.

COTES, ROGER (1682-1716), Eng. mathematician; friend of Newton; first Plumerian prof. of Astron. and Natural Philosophy, Cambridge.

COTES-DU-NORD (48° 25′ N., 2° 50′ W.), department, France, bordering Eng. channel, forming part of ancient province of Brittany; traversed by chain of hills, running S. E. to N. W.; coast much indented; rivers short and navigable; good pastures; chief occupation, fishing; capital, St. Brieuc. Area, 2,786 sq. miles. Pop. 1921, 557,824.

COTGRAVE, RANDLE (fl. 1611), Eng. lexicographer; sec. to Lord Burghley.

CÖTHEN, KÖTHEN (51° 45′ N., 11° 58′ E.), town, Anhalt, Germany; formerly capital of duchy of Anhalt-Köthen; industries include iron-founding and manufacture of machinery. Pop. 20,000.

COTILLION. See DANCE.

COTMAN, JOHN SELL (1782-1842), Eng. landscape artist.

COTONEASTER, genus of rosaceous shrubs bearing red berries, cultivated in gardens.

COTOPAXI (0° 48′ S., 78° W.), mountain, Andes, Ecuador, S. America; loftiest active volcano in world (*c.* 19,600 ft.). Earliest recorded eruption occurred in 1533; most disastrous, 1768; first complete ascent made by Reiss, 1872; later by Whymper, 1880.

COTRONE (39° 8′ N., 17° 8′ E.), seaport and episcopal see, Catanzaro, Italy; ancient *Crotona*; has old castle; exports oranges and olives. Pop 8,000.

COTSWOLD HILLS (51° 50′ N., 2° 5′ W.), range, Gloucestershire, England, extending S. W. to N. E. for upwards of 50 miles, separating basin of Lower Severn from sources of Thames; highest points—Cleeve Cloud, 1,134 ft., and Broadway Hill, 1,086 ft.

COTTA, BERNHARD VON (1808-79), Ger. geologist; pro. of Geol. at Bergakademie in Freiberg.

COTTA, GAIUS AURELIUS (*c.* 124-73 B. C.), Rom. democratic statesman, one of foremost orators of age of Cicero; consul, 75 B. C. His bro., Lucius Aurelius Cotta, was also democratic statesman.

COTTA, JOHANN GEORG (1631-92), Ger. publisher; founder of a firm which flourished through several generations; since transferred.

COTTBUS, KOTTBUS (51° 44′ N., 14° 21′ E.), town, on Spree, Prussia; important railway junction and trading center; chief industry, cloth manufacture. Pop. 50,000.

COTTINGTON, FRANCIS, BARON C. (1578-1652), Eng. statesman and diplomatist; exercised great influence with James I; made Chancellor of Exchequer, 1629; Master of Court of Wards, 1635.

COTTLE, JOSEPH (1770-1853), Eng. bookseller; friend of Coleridge and Southey; bought poems from them, including Southey's *Joan of Arc*; wrote interesting *Early Recollections*, 1837, and some verse.

COTTON, a vegetable product of universal service in providing a fibre that is readily adaptable to spinning in the manufacture of textiles and other material. The ancients early discovered its uses. It is mentioned in historical writings relating to remote ages. There is evidence of its use 3,000 years ago in India, also in Egypt long before the Christian era, as shown by mummy wrappings. It was also known among the early inhabitants of America; notably in Peru. Of the many species of cotton, exceeding fifty, a number outstand as invaluable as the foundation of the enormous industry that has been built upon the fibre. These are the sources of Egyptian cotton; the Sea Island cotton of South Carolina, Georgia, Florida and the West Indies; American upland cotton grown principally in the southern cotton belt from Virginia to Oklahoma southward, produced from a species that contributes about 90 per cent of the American crop; the upland cotton of India, also a product of China, Arabia, Persia, and Africa; and bush cotton, the bulk of India's crop, and the course of Dacca cotton, used in the weaving of Madras cloth and India muslins.

Having so many species, the plant differs widely in character, according to the soil and climate that produce it. The more important species are generally perennial in warm regions; under cultivation their production is best developed by annual crops. The plant thrives best in a deep, rich soil and a moist climate with plenty of sun during its growing stages and a dryer atmosphere when ripening and gathered. This combination of favorable conditions characterizes the southern cotton regions of the United States and has made them preeminent as the world's chief source of supply. The planting is done in the spring; blooming follows two months later. The plant is then picked, a process that may last most of the year. After picking, the seed is separated from the fiber at the ginning mill, and the lint baled for market.

In the marketing of baled cotton after its emergence from the ginning mill, the staple may be bought direct, a 'spot sale' being thus effected. Another form of purchase is by a contract for future delivery, a method by which cotton is largely bought and sold through the world's leading cotton exchanges. The price which determines a transaction for future delivery may either be that at which cotton is sold at the time fixed for delivery or as current at some date previously. The contract requires delivery within a month, whereupon the buyer must accept the cotton and pay for it. Such contracts are known as 'options' or 'futures,' because the seller has the option or freedom to deliver the contracted cotton at any date within the month for which it is sold, and because the transacting differs from a 'spot' or direct deal in being made for future delivery. In practice, dealings in cotton options and futures become largely speculative. The seller frequently has but the cotton available when the transaction is made and trusts to favorable market conditions to carry out the bargain when delivery is due. Both seller and buyer also stand to profit or lose heavily in having to abide by the price fixed, which at the time of delivery may be well above or below the prevailing market figure.

Cotton is graded for market purposes according to the extent and character of foreign matter or impurities present and by the color. The grades for white cotton are designated respectively as Middling Fair, Strict Good Middling, Good Middling, Strict Middling, Middling, Strict Low Middling, Low Middling, Strict Good Ordinary and Good Ordinary.

The bales duly find their way into manufacturing plants, where most of the fiber is converted into cloth and yarn. The fiber furnishes cellulose, which is largely used in the manufacture of gun cotton, and smokeless powder, and also becomes the chief constituent in the fabrication of many useful articles or parts thereof formerly made of wood and metal. The plant is also found serviceable by the conversion of its stalks into fuel and in paper manufacture, while lint waste provides material for making twine, rope, lampwicks, and packing for mattresses, pillows, cushions and upholstery generally. Fertilizers and cattle feed are produced from the cotton hulls. Cotton seed oil and cotton seed meal are well known products of the seed.

In a textile plant the cotton is received closely matted and is first passed through machinery which pulls it apart in lumps; then the contents of many bales are mixed and cleaned. It thus reaches the carding machine, which completes the cleaning process, treats the fibers individually, disposes of those that are broken, immature or stained, and combs out and distangles the fibers and lays them parallel. A process called 'roving' follows, which is the same operation on a much finer scale, the product being a loose twisting of the strands. The final spinning gives an additional twist and converts the roving into a finished yarn. A last operation in the treatment of manufactured cotton is the application of fats, oils and waxes to give it a soft, supply quality; starch for stiffness and weight; gums and ammonia water for a glossy finish; clay or like substances for imparting solidity.

In 1922 there were about 152,000,000 cotton spindles in the world, of which 130,000,000 are actively at work as a rule. Of this number 36,000,000 were in American textile mills. The latter plants in 1919 numbered 1,288, employed on the average 430,966 workers, whose wages amounted to $355,474,937, produced goods to the value of $2,125,272,193, and had a capital of $1,853,099,816. These figures do not embrace factories engaged in producing cotton laces and cotton small wares, which numbered 200. The chief cotton manufacturing states are Massachusetts, North Carolina, South Carolina and Georgia.

The world's production of raw cotton in 1920-21 was estimated by the Department of Agriculture at 19,595,000 bales of 500 pounds gross or 478 pounds net, of which the United States furnished 13,366,000 pounds; India, 2,976,000; Egypt, 1,251,000; and China, 1,000,000. Russia, Brazil, Mexico and Peru contributed to the crop, but in much smaller volume. Among American cotton states, Texas easily led, producing 2,198,158 bales in 1921, then Mississippi with 813,014, and Arkansas, Georgia, the Carolinas, Alabama and Oklahoma following in order. In 1921, 3,339,113,849 pounds of cotton were exported.

There are many technical processes in the manufacture of the finished products. The different varieties, such as calico and other materials are printed by special machinery. See Cotton Boll Weevil.

COTTON BOLL WEEVIL, an insect pest which feeds upon and destroys the boll of the cotton plant. It is very prolific and the possible offspring of a single pair in the course of a season is estimated at 12 million. The secret of the weevil's destructive power lies in the fact that after the eggs have been laid in the buds of the cotton plant, the latter heals over the wound by which its tissues were penetrated and the larva after hatching, and while feeding on the tender leaves of the immature blooms, cannot be reached by poisoning.

The boll weevil began its first depredations in Mexico and Central America and it spread over the greater part of the former country before it appeared in the United States in 1892. In that year a small area of cotton near Brownsville, Tex., was discovered to be infested by the weevils. This area quickly spread, until in 1923 it embraced practically the whole cotton belt and resulted in the depletion of the cotton crop amounting in some cases to over 50 per cent., and in others to a total loss. While countless methods of control have been suggested and tried, only the method of dusting the squares with powdered arsenic of lead has been largely efficacious. The experiment has also been tried of omitting the planting of cotton in certain areas in order to prevent the spread of the weevil, but in spite of this the area affected has steadily increased. Congress has appropriated large sums of money for the destruction of the boll weevil, and the States and individuals have likewise contributed. In many parts of the South it has been found necessary to discontinue the planting of cotton and to substitute for it other crops.

COTTON, CHARLES (1630-87), Eng. poet and translator; was friend of Isaak Walton, and wrote second portion of *The Compleat Angler*; also produced the standard trans. of *Montaigne's Essays*.

COTTON GIN. See Cotton.

COTTON-GRASS (*Eriophorum*), member of *Cyperoeceoe* family, so called from cotton-like processes developed from the perigone which encloses the ovary; used, but not extensively, for stuffing cushions, etc.; of little value as fodder.

COTTON INSECTS, pests which destroy the cotton crops before they can be harvested. The two most destructive of these insects are the cotton worm and the boll worm. The first is the larva of a buff colored moth which feeds on the leaves of the cotton plant, said to have originally migrated from South America. It first appeared in 1804. It is also known in the northern states, but what it feeds on in the non-cotton districts is not certainly known. It lays its eggs on the under side of the leaves, and within from 50 to 60 hours they hatch out, in such numbers that within three days they may destroy the whole crop. For thirteen days their active life continues, then they fold up within a leaf, hibernating until they emerge as adult moths. Thus sometimes seven generations are bred in a season, there being about a month between each generation. The boll worm is also the larva of a nocturnal moth, which attacks tomato, tobacco and corn plants as well as cotton. See Cotton Boll Weevil.

COTTON, JOHN (1585-1652), Anglo-Amer. puritan; vicar of Boston, Lincoln, 1612-32; forced to emigrate, and became minister of First Church of Boston, New England; great influence on religious developments in New England.

COTTON SEED OIL, a by-product of the cotton plant, extracted from the seed. The utilizing of this oil for practical purposes and its successful extraction was due to American invention. A patent is on record as long ago as 1799 protecting a process for extracting oil from cotton seed. Mills were established and in due time it was demonstrated that oil for commercial purposes could be obtained from such a source. Formerly the planters threw away the seed. The oil has been found a good substitute for olive oil. It is also largely used in the manufacture of soaps. Of more notable value is its service as a food, shown by its successful use in the manufacture of margarine, or artificial butter, and in mixing it with lard. Its employment as an ingredient of food was attacked and made it subject to scrutiny. But analysis proved it to be a pure food product, nutritious and healthful. Cotton seed oil was reported to be superior to hog's lard for cooking purposes. In producing the oil, the seed is first washed, then crushed, and reduced to a mealy mass, from which the crude oil is extracted. The solid residue is the cotton seed oil cake of commerce, used for cattle food. It is also utilized for fertilizer and dyestuffs. The refined oil appears in cosmetics, preserved olives, packed sardines, and as an emulsion for medical purposes. Cotton seed oil has a number of other uses.

COTTON, SIR ROBERT BRUCE (1571-1631), Eng. antiquary and politician. 'Cotton House,' on site of present

House of Lords, was meeting place of antiquarian soc.

COTYS (fl. 382-358 B. C.), king of Thrace; notorious tyrant.

COUCH-GRASS (*Triticum repens*), tough, many-rooted plant; grows well in sandy soil and makes moderate hay, but oftener becomes a weed.

COUCY-LE-CHATEAU (49° 31′ N. 3° 19′ E.), village, Aisne, France; ruined feudal castle (XIII. cent.), now state property.

COUDERT, FREDERIC RENÉ (1832-1903), American lawyer and publicist, *b.* New York City. He graduated at Columbia University in 1850 and three years later began the practice of law. He speedily attained eminence, and his reputation as an authority on international law caused him to be chosen as counsel or member of many important international commissions. He represented the United States as counsel before the Bering Sea Tribunal of Arbitration in 1892 and was a member of the Venezuela Boundary Commission in 1896. For many years he represented the interests of the French Government in the United States. His services were recognized by decorations from France, Italy and Venezuela. His publications include *International Law*, *The Rights of Ships*, 1895; and *Addresses, Historical-Political-Sociological*, 1905.

COUÉ, EMIL (1855), a French hypnotist, *b.* in France. As a youth he studied pharmacy and was for many years established as a druggist in Nancy. During this period, beginning with the early 80's, there was practicing in Nancy what was known as the 'Nancy school of hypnotism,' at the head of which was the famous Bernheim. The Nancy school was then establishing the theory that hypnotism is a normal condition, which may be induced in any healthy person, thereby scoring an important triumph over the Paris school, headed by Charcot, which contended that it was an abnormal manifestation and usually a symptom of hysteria. As a pharmacist Coué became interested in the therapeutic phase of the controversy, and especially in the contention of Bernheim that most illness was due to suggestion and could be cured by hypnotism, which was merely counter-suggestion. In 1904 Coué definitely abandoned his business and began actively to practice hypnotism, as a member of the Nancy school. He soon distinguished himself from his colleagues in the great amount of latitude he gave his patients in treating themselves under his verbal instructions. Adopting Bernheim's theory that hypnotism was suggestion from the operator to the patient's subconscious mind, he came to the logical conclusion that the patient, without needing to enter the complete hypnotic condition, could produce results through auto-suggestion, without the intervention of an operator. This enabled him to take on such a vast number of patients, compared to his colleagues, that he quickly acquired a national and later an international reputation, more especially as the percentage of cures increased rather than diminished through wholesale mode of treatment. Coué was invited to demonstrate his theory in London, which he did so successfully that his name became as widely known in England as in France. In the following year Lord Curzon, suffering from nervous breakdown, went to Nancy to consult Coué. Soon after he publicly announced an almost miraculous cure, as a result of which Coué became world famous. On January 5, 1923, he arrived in New York, beginning a tour of lectures and demonstrations which lasted a month.

COUES, ELLIOTT (1842-99), American surgeon and naturalist, *b.* Portsmouth, N. H. He graduated from Columbian University, Washington, D. C., in 1861 and entered the Union Army as a medical cadet. His medical services through the war gained him the rank of brevet captain. He served as surgeon and naturalist to the United States Boundary Commission in 1873, and in 1877 taught in the department of anatomy at the Columbian University. He was one of the charter members of the American Ornithologist's Union, edited several departments of the Century Dictionary and did important work for the Smithsonian Institution. Among his publications may be cited *Birds of the Northwest*, 1874; *New England Bird Life*, 1881; *Biogen*, 1884; and *The Daemon of Darwin*, 1884.

COUGAR. See CAT FAMILY.

COUGH, generally a reflex act produced with the object of removing some substance that is irritating a part of the respiratory system. Besides irritation caused by inflammation or obstruction in the bronchial and nasal passages, the cause may be cerebral or gastric, or may even be in the ear or the teeth. Treatment should be directed to removing the cause, but where it is merely the result of simple congestion or inflammation, counter-irritants, expectorants, and sedatives may be used. See WHOOPING-COUGH.

COULOMB, the practical unit of electrical charge or quantity of electricity is called a coulomb, so named in honor of Augustin de Coulomb, the noted French engineer and physicist of the 18th century.

The Chicago International Electrical Congress of 1893 formulated the following definition which was accepted and adopted by the National Academy of Sciences on Feb. 9, 1893. Passage by the U. S. Congress on July 12, 1894, made this definition legal in the U. S. 'The unit of quantity (of electricity) shall be what is known as the international coulomb, which is the quantity transferred by a current of one international ampere in one second.'

COULOMMIERS (48° 50′ N., 3° 5′ E.), town, Seine-et-Marne, France; chief industry, printing; large trade in cheeses. Pop. 5,000.

COULTER, JOHN LEE (1881), American educator and statistician, *b.* Mallory, Minn. He studied at the Universities of Minnesota, Wisconsin and North Dakota and at Iowa State College, in which latter institution he was later an instructor. From 1910 to 1912 he was in the Government service as an expert special agent of the Census Bureau. He served on the War Industries Board, 1918. His published works include *Economic History of the Red River Valley of the North*, 1910; *Co-operation Among Farmers*, 1911; and *The Problem of Rural Credit*, 1913.

COULTER, JOHN MERLE (1851), botanist, *b.* at Ningo, China. He was educated at Hanover College and at Indiana University. From 1872-3 he was botanist with the U. S. Geol. Survey in the Rocky Mountains and in 1874 became professor of natural sciences at Hanover College. Five years later he accepted the position of professor in biology at Wabash College which he resigned in 1891 to become president of Indiana University. He was also president of Lake Forest University from 1893 until 1896, when he became professor and head of the department of botany at the University of Chicago. He was editor of the Botanical Gazette, which he founded in 1875, and was the author of many books on botany.

COUMARIN ($C_9H_6O_2$), organic compound extracted from tonka bean and sweet woodruff; M. P. 67°; B. P. 290°. Artificial c. occasionally used in perfumery.

COUNCIL (Lat. *concilium*, assembly), assembly summoned to settle disputed ecclesiastical points; useful in early days of Church for codification of doctrine, and important later in adjustment of relations of Church and State. Chief forms of c. held are general, patriarchal, provincial, papal, national, and diocesan. C. held at Jerusalem, mentioned in *Acts* and *Galatians*, is considered as parent and precedent; in later II. cent., Churches of Asia Minor assembled to discuss doctrines of Montanus, and system speedily developed. General (*oecumenical*) C's originated in IV. cent., Constantine summoning synods to Rome and Arles to discuss Donatism, and C. of Nicæa, 325, to dispose of Arianism. A dispute arose later as to the authority of C's; the papal party denying the validity of its decisions until ratified by pope, who in XI. cent. acquired sole right to summon General C. During the schism, 1378-1417, cardinals held C. of Pisa, 1409; papal or ultramontane party attacked at C. of Constance, 1414-18, and later at C. of Basel, reformers asserting that General C. was superior to pope; ultramontanists triumphed at C. of Florence, 1439, and confirmed papal position at Lateran C. of 1616.

COUNCIL BLUFFS, a city of Iowa, in Pottowattamie co., of which it is the county seat. It is on the Missouri River, opposite Omaha, Nebraska, with which it is connected by several bridges. The city is the eastern terminal of the Union Pacific Railroad, and is the junction point of all eastern railroads which join that line. It is located at the foot of high bluffs, 4 miles from the river. The city is a trading center for southern Iowa. It is also important industrially and has repair shops, stock yards, grain elevators and other interests. The principal industries include printing and publishing, flour and grist milling and the making of brick. The city is connected with Omaha by electrical railway, and has several fine parks. The notable buildings include a court house, U. S. Government building, high school, Masonic Temple, and Union Depot. There is a library, Y. M. C. A. and the State Institution for Deaf Mutes. The city derives its name from a council held on the bluffs, between the Indians and the explorers, Lewis and Clarke. In 1846 it was a Mormon settlement, and in 1853 received a city charter. Pop. 1920, 36,162.

COUNCIL OF CONSTANCE. See CONSTANCE, COUNCIL OF.

COUNCIL OF TEN. See VENICE.

COUNCIL OF WORKINGMEN AND SOLDIERS, also familiar under the Russian name 'soviet.' In origin the Council is quite distinct from Bolshevism, with which it has recently become so closely associated as to seem identical. The first councils, at first known as councils of workingmen, were organized by the Social Democrats in Moscow, during the revolution of 1904-5, being patterned after the New England township meeting, which institution was deeply admired by the Russian revolutionists. The council had both a geographical and an industrial basis, all the workers in a a given community being eligible to representation in the councils, individually where few in numbers, through elected delegates where in large numbers. The councils were entirely destroyed during the revolution of 1904-5, but on the downfall of the Russian autocracy in March, 1917, they were immediately reorganized by the Socialists and labor elements, to co-operate with the Duma in forming a provisional government for the country. On account of the large numbers of workers and peasants serving in the ranks, the title 'council of workingmen and soldiers' was then adopted. It was the desire of the Socialists to form a government based on the councils, which desire, in opposition to the more conservative plans of the Duma, caused much friction. The Constituent Assembly which was afterwards elected was in the nature of a compromise. On coming into power, in November, 1917, through means of armed revolution, the Bolsheviki adopted the councils, or soviets, as their medium of organization, abolishing the Constituent Assembly.

COUNCILS OF CONSTANTINOPLE See CONSTANTINOPLE, COUNCILS OF.

COUNT (Lat. *comes*), Eng. word to express foreign title equivalent to 'earl.' Rom. emperors' councillors were called *comites*, and councillors entrusted with special departments of administration received titles such as C. of Africa, or C. of the Saxon Shore. The title was retained by the Franks, whose kingdoms rose on the ruins of the Rom. Empire. Besides c's of various territorial divisions, there were c's of palace, stable, etc., *comes stabuli* degenerating into 'constable.' These officers, though they often became hereditary, were not necessarily so. In France from X. cent., c. became generic title of nobility. In Germany in XII. cent. the c. (*graf*) received definite status, modified by other considerations, such as his rank as a landowner. There are now many degrees of *graf*, the lowest being little more than acknowledgment of noble birth. The same is the case in Italy, but its use is more strict in Spain.

COUNTERFEITING, the crime of making and uttering sham coin or paper money with intent to defraud.

COUNTERPOINT, musical term for one melody played against another; point is old term for note; 'plain c.' consists of melody with one of five types of variation; in 'double c.' two melodies are employed.

COUNTERSIGN.—(1) Military password to be given when sentry challenges; (2) additional signature to a document.

COUPERUS, LOUIS (1863), Dutch novelist; *b.* The Hague, Holland, of Scotch lineage. His youth was spent in Java; later he traveled in Europe. His reputation as a writer was established by the publication in 1889 of his first novel, *Eline Vere*, a psychological study of Dutch society. His later works include *Ecstasy*, a study in happiness; *Old People and the Things that Pass*; *The Inevitable*; *The Tour*; *A Story of Ancient Egypt*; and *The Hidden Force*; a study of modern Java. Most of the English translations of his works are by Alexander Teixeira de Mattos.

COUP D'ÉTAT, successful attempt made by ruling power to gain supreme control; a good example is Louis Napoleon's effort in 1851.

COUPLET, two consecutive lines of verse which rhyme with each other; more especially lines in which sense is complete with end of second line. *Heroic Couplet* (decasyllabic), greatly favored from Restoration onwards, was perfected by Dryden and Pope.

COUPLING is an appliance used in machinery for the purpose of connecting different parts. As applied to the cars on a railway, it signifies the method by which the two cars are joined together. The C. may be one which is worked by hand, or an automatic one, the latter acting as a means of joining when the two cars come together. The ordinary C., which is not automatic, consists of links and a screw. On one car is a hook and one link is placed on the hook and made secure by means of the screw. There are various other forms of C. used for different parts of machinery.

COUPON (Fr. *couper*, to cut off), document entitling holder to some benefit; warrant attached to bonds, etc.

COURANTE, dance of Fr. and Ital. origin. In the Suite it is generally found with 'doubles' or variations.

COURBET, GUSTAVE (1819-77), Fr. artist; celebrated for landscapes and seascapes, including *The Valley of the Loire*, *The Wave*, *Bathers*, etc.

COURBEVOIE (48° 51′ N., 2° 19′ E.), town, on Seine, France; bleaching and wagon building. Pop. 25,000.

COURCELLES (50° 27′ N., 4° 22′ E.), town, Hainault, Belgium; coal and iron. Pop. 17,000.

COURCELLE-SENEUIL, JEAN GUSTAVE (1813-92), Fr. economist.

COURCI, JOHN DE (*d. c.* 1219), Anglo-Norman employed by Plantagenet kings in Ireland; subdued and fortified large part of Ulster.

COURIER, PAUL LOUIS (1773-1825), Fr. author and democratic politician; imbibed ideals of Gk. republics, and laid aside his noble title 'de Méré' works, valuable for style and record of manners.

COURLAND. See LATVIA.

COURNOT, ANTOINE AUGUSTIN (1801-77), Fr. mathematician; advocated mathematical consideration of economic problems.

COURSING, the ancient sport of hunting the hare, by sight, with greyhounds.

COURT, ANTOINE (1696-1760), Fr. Huguenot; reorganizer of Fr. protestantism after persecution by Louis XIV.; established important seminary at Lausanne.

COURT, CONTEMPT OF. See CONTEMPT OF COURT.

COURT OF CLAIMS. See JUDICIARY, UNITED STATES.

COURT OF INTERNATIONAL JUSTICE, PERMANENT. See INTERNATIONAL JUSTICE, PERMANENT COURT OF.

COURTRAI (Flem. *Kortrijk*), town, W. Flanders, Belgium (50° 49′ N., 3° 17′ E.), on the Lys, 27 m. by rail S.W. of Ghent; famous for its table linens and lace; notable buildings include Hôtel de Ville, 16th cent; Church of St. Martin, Notre Dame with its *Raising of the Cross* by Van Dyck, and Pont de Broel with its flanking towers. Pop. 36,000. In the World War Courtrai was occupied by the Germans, Aug. 24, 1914; became an important base for their assaults on Ypres, and was recovered in the advance of the Allied forces under King Albert of Belgium, Oct. 16, 1918.

COURTS, MARTIAL. See MARTIAL LAW.

COURTS, CHILDREN'S. See CHILDREN'S COURTS.

COURTS, UNITED STATES. See JUDICIARY, UNITED STATES.

COUSIN, VICTOR (1792-1867), Fr. philosopher; founder of modern Eclectic School; lectured in Sorbonne, Paris, 1815; identified with struggles of his country for civil and intellectual liberty. In 1821 Cousin was suspended from chair for liberal opinions; replaced in 1828, and lectured on Hegel to crowded assemblies; became minister of public instruction, and between 1831 and 1848 laid foundations of modern elementary education in France; remembered largely for the impetus he gave to the study of philosophy in France and for the school he founded. Chief works, *Translations of Plato*, in 13 vols.; essays on Abélard, Pascal, Locke; *Hist. of Philosophy.*

COUSINS, SAMUEL (1801-87), Eng. mezzotint engraver; executed engravings of *Lady Acland and Children* and *Master Lambton* (Lawrence); first R.A. engraver 1855; left £15,000 to Academy for poor artists.

COUTANCES, town, episcopal see, Manche, France (49° 3′ N., 1° 25′ W.); fine Gothic cathedral; 14th cent. aqueduct; black lace, parchment, leather; trade in cattle and horses. Pop. 6,500.

COUZENS, JAMES (1872). Public School Education. Held the positions of vice president and general manager of the Ford Motor Co. in Detroit, Canada and England and was president of the Bank of Detroit, the Highland Park State Bank and the Rogers Shoe Co. Was Mayor of the city of Detroit for the term of 1919 and also president of the Detroit Board of Commerce and director of the United States Chamber of Commerce. Appointed in 1922 to United States Senate to fill unexpired term of Truman H. Newberry.

COVENANT, an agreement between states or persons; the written instrument containing the terms of agreement (properly, *under seal*); in O.T., God's promises to man, on the condition of man's obedience and faith.

COVENANTERS, Scot. political party which held principles laid down by Scottish Covenants; persecuted after Restoration of 1660; defeated at Rullion Green, 1666; won battle against Claverhouse at Drumclog, 1679, but were defeated at Bothwell Brig, June 22, 1679; the following years are known as 'the killing time.'

COVENT GARDEN, near Charing Cross, London; originally 'convent' garden, the district having been site of garden belonging to Westminster Abbey; now one of the most important fruit, flower, and vegetable markets in England; the present market-place was erected in 1830.

Covent Garden Theatre, opened in 1732 became rival of Drury Lane; there Mrs. Siddons took leave of stage, and Macready first acted; through it Wagner's music was introduced to London; destroyed by fire, 1808, and second building also destroyed, 1856; present building is home of grand opera in London.

COVENTRY, city, munic., parl., co. bor., mkt. tn., on riv. Sherbourne, Warwickshire, England (52° 26′ N., 1° 30′ W.); bishopric founded 656; ruined abbey, once a magnificent Benedictine monastery, founded 11th cent. by Earl Leofric and Lady Godiva, the latter of whom figures in a town pageant; has several fine old churches; noted since Middle Ages for wool and dyeing trade; now chief seat in U.K. for manufacture of motor cars and bicycles; ribbons and watches, woolens, carpets; printing, iron-founding; during World War specially active in munition work; famous for mysteries and miracle plays, 15th and 16th cents.; borough returns one member to Parliament. Area, 4,147 ac.; pop. 140,000.

COVENTRY, a town in Rhode Island, in Kent co. It is 18 miles S.W. of Providence and is an important manufacturing community. Pop. 1920, 5,670.

COVERDALE, MILES (1488-1568), Eng. reformer and translator of Bible; his trans. of Bible (far inferior to Tyndale's) was pub. in 1535; parts subsequently incorporated in A.V.; famous preacher under Edward VI.; made Bishop of Exeter in 1551; deposed under Mary. See BIBLE.

COVINGTON, a city of Kentucky, in Kenton co., of which it is the county seat. It is on the Ohio River, opposite Cincinnati, and on the Louisville and Nashville, and Chesapeake and Ohio railroads. It is connected with Cincinnati by a suspension bridge, 2,250 feet long, and is connected with the neighboring cities by electric lines. It is a popular residential town for business men from Cincinnati. Covington is the center of an important farming and live stock region and is the trade center of central Kentucky. It is connected by steamer with the important river points. Its industries include the manufacture of cotton, wool, iron, tobacco, etc. Prior to the adoption of the Prohibition Amendment there were many large distilleries. The notable buildings include the city hall, a court house, U. S. Government building, public library, Roman Catholic Cathedral. The city was settled in 1812, and was incorporated in 1834. Pop. 1920, 57,121.

COWARD, EDWARD FALES (1862). Studied at Lyons Collegiate Institute of New York and received LL.B. from Columbia in 1883. Was well known as an amateur actor and appeared continuously for a period of fifty years in 187 roles. Was dramatic editor and critic for the New York Evening Sun, and also the New York World and was a special writer for the Theater. Author of several plays, among which are: *The Lady from Chicago*; *Hearts Are Trumps* and *Around New York in 80 Minutes*.

COWBOYS, a term first employed during the American Revolution to banks of Tories who invested the territory around New York City. Later it was used to designate the skilled horsemen who have charge of the cattle on the ranges of the West.

COWES, seapt., wat.-pl., Hants, England (50° 46′ N., 1° 17′ W.); headquarters of Royal Yacht Club; celebrated regattas. Osborne House, a favorite residence of Queen Victoria, was presented to nation by Edward VII. as convalescent home for officers, 1902. Pop. *c.* 16,000.

COWLES, WILLIAM SHEFFIELD (1846), Admiral U.S. Navy. Graduated from U.S. Naval Academy 1867. Promoted Rear Admiral April 23, 1908. Served on Isthmus of Panama, 1884; naval attache U.S. Embassy, London 1893-7. Commanded the Fern, 1897-8; Topeka, 1898-9. Naval representative to Tercentenary Celebration, Quebec, July, 1908. Retired August 1, 1908. Chairman Naval and Military Committee Connecticut Council of Defense in World War.

COWLEY, ABRAHAM (1618-67), Eng. poet and essayist; he is chiefly remembered by his *Pindaric Odes* and some fine elegies; and his prose essays, distinguished by directness and simplicity, continue to hold a high place in English literature.

COWPER, WILLIAM (1731-1800), Eng. poet; educated for the bar; early developed symptoms of brain weakness, which rendered a settled occupation impossible. He subsequently retired to the village of Olney (Bucks), where the good genius of his life was Mary Unwin, widow of a friend. He collaborated with the Rev. John Newton in writing the *Olney Hymns*. In this environment he amused himself with his tame hares and other pets; left Olney for London in 1779; wrote *The Task*, 1785; the ballad of *John Gilpin*, and other poems. His verse fills the transition period between the classicism of Pope and the nature poetry of Wordsworth, and therefore Cowper stands as a landmark in Eng. literature. In addition, he was a great letter-writer.

COWRY, or **COWRIE** (*Cyproea*), genus of marine gasteropoda; shells of *C. moneta* and *C. annulus* used as currency in Pacific and Eastern seas; other species are used as ornaments.

COWSLIP, common European plant, *Primula veris*, with small and delicate flower; appears early in spring, and is somewhat like primrose, though differing in the umbelliferous arrangement of its flowers; cowslip wine is distilled from the flowers.

COX, JACOB DOLSON (1828-1900), American soldier and legislator, *b.* Montreal, Canada. He graduated from Oberlin in 1851 and entered on the profession of law. In the Civil War he served with credit, emerging from the conflict with the rank of major general of volunteers. In 1865 he was elected Governor of Ohio, and four years later entered the Cabinet of President Grant as Secretary of the Interior. He resigned in 1870 and in 1873 became president of the Wabash railroad. He served one term in Congress (1877-79). He published *Atlanta, The March to the Sea, Franklin and Nashville* and *The Battle of Franklin.*

COX, JAMES MIDDLETON (1870), publisher, *b.* Jacksonburg, Butler co., Ohio. He was raised on a farm, received a primary school education, worked in a printer's office and taught in a country school for two years. Newspaper work attracted him and he became a reporter in Middletown, Ohio. Later he joined the Cincinnati Enquirer. In 1894 he became acquainted with Congress as Secretary to Representative Paul Sorg. His public career may be said to have begun upon his acquisition in 1898 of the Dayton Daily News. Five years later he bought the Springfield, Ohio, Press Republic, publishing it thereafter as the Daily News. The two papers, similarly named, formed the New League of Ohio. In 1908 and 1910 he served as Democratic member of Congress from the Third Ohio District. In 1912 he was elected governor of Ohio, but suffered defeat for re-election in 1914. Two years later he was nominated again and elected; from 1918 to 1920 he served a third term as governor. His administrative ability as governor of Ohio, added to his energetic support of progressive legislation, made him of national note, and paved the way to his nomination as Democratic candidate for President in 1920. He was defeated by Warren Gamaliel Harding, the nominee of the Republican Party.

COX, KENYON (1856-1919), American artist, *b.* Warren, Ohio. He pursued his art studies in Cincinnati and at the Pennsylvania Academy of Design and from 1877 to 1882 in Paris. The following year he returned to New York, where his ability was promptly recognized. Much of his work was in the line of mural decoration, and important examples exist in the Library of Congress and in the State Capitols of Minnesota, Wisconsin and Iowa, as well as in many libraries and municipal buildings. He won many awards and was a member of numerous art societies and academies. Among his publications are *Old Masters and New, Painters and Sculptors, The Classic Point of View and Concerning Painting,* 1917.

COX, PALMER (1840), artist and author. Graduated from Cranby Academy. Author of *Hans Van Pelters Trip to Gotham, How Columbus Found America, The Brownies, Their Book, Queer People, The Brownies at Home, The Brownies Around the World*; *The Palmer Cox Brownie Primer, The Brownies Many More Nights, The Brownies and Prince Florimel,* 1918. He originated and drew humorous pictures to illustrate his books. His series of Brownie drawings have obtained world wide recognition.

COX, RICHARD GARFIELD (1881), Graduated from Hiram College in Ohio, 1902, and received A.M. from Columbia University in 1911. Also attended the University of Chicago during the summers of 1906 and 1907. Taught at Todd Seminary, Woodstock, Ill., South Kentucky College, Hopkinsville, Ky., Columbia Military Academy, in Tenn., Drake University, Iowa, and Ward-Belmont College, Nashville, Tenn. President of Nashville College for Young Women from 1917-18 and in 1919 was made President of Gulf Park College at Gulfport, Miss. During 1918-19 was educational secretary and lecturer for the Y.M.C.A. in France and Germany.

COX, SAMUEL SULLIVAN (1824-89), American legislator and author, *b.* Zanesville, Ohio. He graduated at Brown University in 1846 and later entered on a legal career, which however he soon forsook for journalism and politics. In 1853 he was the editor of the Ohio Statesman. He served long in Congress as a Democratic member from Ohio (1857-65) and from New York (1869-85) (1886-89). He took especial interest in legislation for the benefit of letter carriers, and a statue of him erected by them stands in Astor Place, N. Y. City. He bore the sobriquet of 'Sunset,' attached to him because of a florid bit of descriptive writing published during his newspaper career. His publications include *Eight Years in Congress*, 1865; *Why We Laugh*, 1876; *Diversions of a Diplomat in Turkey*, 1887; and numerous other works.

COYOTE (*Canis latrans*), prairie wolf of western N. America, with heavy yellowish-grey fur; hunts in packs, and possesses characteristic howl.

CRAB, term for decapod crustaceans with a short abdomen (tail) inturned under the thorax, which is covered by a more or less flattened shell or carapace. This sub-order, Brachyura, also includes forms with a soft (uncalcified) tail, such as the hermit crabs. Crabs are generally adapted for life at the sea-bottom, but shore and land crabs (Gecarcinidæ) can spend a large part of their lives outside the sea.

CRABBE, GEORGE (1754-1832), Eng. poet; befriended by Burke, Fox, and others; took orders, and, receiving patronage of the Duke of Rutland and Lord Thurlow, devoted his leisure to production of poetry. His *Parish Register*, *The Borough*, *The Village*, *The Library*, and other works are marked by homely realism, of which he was a master.

CRACOW, the former capital of Poland. It later formed a part of Austrian Galicia. It is on the left bank of the Vistula and consists of the old city and several suburbs. It has many fine buildings including a cathedral which contains the monuments of many Polish kings and notables. The region about Cracow was the scene of much fighting during the World War. Following the formation of the republic control of Poland, Cracow became a part of it. Pop. about 180,000.

CRADDOCK, CHARLES EGBERT. MURFREE, MARY N.

CRADLE OF LIBERTY. See FANEUIL HALL.

CRADOCK, SIR CHRISTOPHER (1862-1914), Brit. admiral; had a very distinguished career in the navy, and was a capable and most popular sailor; took part in the Sudan campaign of 1891, and was present with the Brit. naval brigade at the relief of Peking, 1900, being promoted captain for the great daring which he then displayed; later, led the Brit., Amer., Jap., and Ital. forces for the relief of Tien-tsin; rear-admiral, 1910; immediately prior to the World War was in command of a squadron off Mexico, and by his exertions during a crisis in that country probably saved the lives of hundreds of Europeans and Americans; early in August 1914 he set sail to protect the southern trade routes menaced by the Ger. Admiral von Spee; by the third week of Oct. he was in the Pacific moving up the coast of Chile, calling at Coronel and Valparaiso and then returning to the former port; on Nov. 1, von Spee's squadron was sighted, and, though it was more powerful than his own, Cradock gave battle (see CORONEL, BATTLE OF); the allegation that he was intercepted by a superior Ger. squadron and brought to action against his will was refuted by Mr. Balfour when unveiling a memorial tablet in York Minster, June 16, 1916.

CRAFTS, WILBUR FISK (1850-1923), *s.* of Rev. Frederick A. Crafts. Graduated from Wesleyan University, 1869, A.M. 1871, B.D., Boston University 1871; (Ph. D., Marietta College, 1896). Was Methodist Minister 1867-79; Congl. 1880-3 and Presbyterian since 1883. Founded American Sabbath Union 1889; chief editor Christian Statesman, 1901-3; Twentieth Century Quarterly, 1896. Author of *Trophies of Song*, *Through the Eye to the Heart*, *Childhood*, *The Textbook of the Age and Fireside Talks on Genesis. That Boy and Girl of Yours* and other *Addresses*, 1921. Founded in 1895 the International Reform Bureau and until his death its head.

CRAIG, CHARLES FRANKLIN, (1872). In addition to public school education received at Danbury, Conn., he later attended various business colleges at Bridgeport, Conn., and graduated from the Medical College at Yale in 1894. Was pathologist and bacteriologist in several United States Army hospitals and a member of the U.S. Army Board for the Study of Tropical Diseases, Manila, 1906-7. Organized and commanded the Yale Army Laboratory School, 1918-19. Was professionally connected with the Army Medical Museum at Washington, D. C., and the Medical Dept. of George Washington University. In 1920 became professor of bacteriology, parasitology and preventive medicine, and director of laboratories at the Army Medical School, Washington, D. C. Besides chapters in *Osler's Modern Medicine*, 1907; *Here's Modern Treatment*, 1911, and *Oxford Medicine* and *Oxford Tropical Medicine*, 1919, he wrote: *The Aestivo-Autumnal Malarial Fevers*, 1901; *The Malarial Fevers, Haemoglobinuric Fever* and *The Blood Protozoa of Man*, all in 1909 and the *Wasserman Test* in 1918.

CRAIG, EDWARD GORDON (1872), English actor and author, *b.* near London. He is the *s.* of the celebrated actress Ellen Terry. He played child's parts when he was only six years old, but his real debut was made in 1889 when he played in the same company with his mother and Henry Irving. He remained on the stage until 1897 when he retired. From 1900 he has devoted himself to stage production in which he has achieved marked success. He has written *The Art of the Theater*, 1905; *On the Art of the Theater*, 1911; *Toward a New Theater*, 1913, and *The Theater Advancing*, 1921.

CRAIK, DINAH MARIA, *nee* **MULOCK** (1826-87), Eng. novelist; wrote *John Halifax, Gentleman*, 1857; *A Life for a Life*, and numerous other popular stories, as well as serious studies and some unpretentious, melodious verse.

CRAIK, GEORGE LILLIE (1798-1866), Scot. man of letters; wrote *History of English Literature and the English Language*, 1861, which is still valued for its biographies.

CRAM, RALPH ADAMS (1863), American architect. Educated Augusta, Me., Westford, Mass., and Exeter, N. H. (Litt. D. Princeton, 1910; LL.D. Yale, 1915). Supervising Architect Princeton University; Professor architecture, Massachusetts Inst. Tech.; Chairman Boston City Planning Board. Member American Academy of Arts and Sciences, National Institute of Arts and Letters. Member of American Federation of Art, Architectural Ass'n., London. Author of *The Decadent*; *Black Spirits and White*; *Church Building*, 1901; *Impressions of Japanese Architect and the Allied Arts*, 1906; *Excalibur*, 1908; *The Nemesis of Mediocrity*, 1918; *Walled Towns*, 1919; *Towards the Great Peace*, 1922.

CRAMP, painful spasmodic contraction of muscles, usually of the limbs, the calf of the leg being most frequently affected; due to some obscure nervous derangement. Generally it occurs when the muscles are fatigued, and it is common in parturition, in cholera, and in persons of a gouty tendency. When the calf is attacked by cramp the leg should be straightened and the foot turned forcibly upwards, to stretch out the calf muscles. Writer's cramp affects the fingers so that they cannot be used, and should be treated by massage, electricity, and exercise of the affected parts. Bather's cramp is probably a spasm of the respiratory muscles.

CRAMPTON, HENRY EDWARD (1875). Studied at College of the City of New York, 1889-92; A.B. Columbia, 1893, and Ph.D., 1899. He was an instructor in the Massachusetts Inst. Tech. 1895-6 and an instructor in embryology at the Marine Biological Laboratory, at Woods Hole, Mass. from 1895 to 1902. During 1906-7-8 and 9 he made expeditions to the Islands of the South Pacific Ocean and to British Guiana and in 1911 to the interior of Brazil. Also made several other expeditions from 1912 to 1921 to many parts of the world including the South Seas, the Bahamas, Western Pacific and Australia.

CRANBERRY, a species of *Vaccinium*, belongs to the Ericaceæ and is a member of the same genus as the blackberry (*q.v.*) and huckleberry. *V. oxycoccus*, as it is usually called, has also been given the names of *Oxycoccus palustris* and *Schollera oxycoccus*, while an American species was known as *Oxycoccus macrocarpus*. The British C. is found wild abundantly in the fens of Norfolk, Lincolnshire, and many other parts of England, and it occurs frequently in the Highlands of Scotland. The fruit is a round, sharp red berry which makes excellent tarts and preserves, and is often stewed with apples to give them a nice color.

CRANE, machine by which a load may be raised or lowered vertically and moved horizontally. When the machine lifts vertically only it is called a winch, hoist, or lift, and when coal, cereals, and other materials are moved, not in loads but continuously, the appliance is termed a conveyor. Cranes may be classified as revolving or non-revolving. Manual, hydraulic, steam, and electric power are used, the latter especially in travelling cranes. The jib and derrick crane consist mainly of a revolving pillar or mast for the slewing movement, a jib which may be lowered or raised for the vertical movement, and the tackle passing from a winding drum along and over the end of the jib, and provided with a hook for attaching the load. Davits are an example of crane where jib and mast are in one piece. Portable cranes are mounted on trucks or gantries —(*e.g.*) running on rails alongside harbor quays. Traveling cranes consist of a bridge resting on wheels running on rails —say on two opposite walls of a shed— and the jenny or crab carrying the hoisting mechanism, which runs on rails along the bridge. Many varieties of crane have been constructed—(*e.g.*) the Titian crane, a combination of the travelling and revolving type, used in constructing piers and breakwaters.

CRANE, BRUCE ROBERT (1857), American artist. Educated public schools, New York. Studied painting under A. H. Wyant, Specialty American landscapes; awarded Webb prize, Society American Artists, 1897; George Innes Gold Medal, National Academy Design, 1901; Gold Medal St. Louis

Expn., 1904; Gold Medal National Academy Design, 1912; Silver Medal Panama, P. I. Expn., 1915. Member American Water Color Society, of New York.

CRANE, CHARLES RICHARD (1858), American diplomat and financier. Educated public schools, Chicago. Pres. of Crane Co., Chicago, 1912-14. Director of National Bank of the Republic, Chicago. Vice Chairman of Finance Committee, Wilson Campaign, 1912. Trustee Chicago Bureau Public Efficiency. Pres. of the Trustees of American College for Girls, Constantinople. Member of President's Special Diplomatic Commission to Russia, 1917.

CRANE, FRANK (1861), American writer and minister. Student Illinois Wesleyan University. (Hon. Ph.B. 1892; D.D. Nebraska Wesleyan University, 1894). Ordained Methodist Episcopal ministry, 1882. Entered journalism, 1909. Author of *The Religion of Tomorrow*, 1899; *Vision*, 1907; *The Song of the Infinite*, 1909; *Human Confessions*, 1911; *God and Democracy*, 1911; *Foot Notes to Life*, 1913; *War and the World Government*, 1915; *Adventures in Common Sense*; *Christmas and the Year Round*; *The Crane Classics* (10 vols.), 1920.

CRANE, RICHARD (1882). Graduated from Harvard in 1904. Was connected with the Crane Co., Chicago in 1904 and was president of the Crane Valve Co. from 1910-14. Elected commissioner of Rivers and Harbors Committee, 1909 and was a member of the Public Safety Commission of Chicago and of Cook County, Ill., from 1913 to 1915. Served as United States Minister to the Republic of Czecho-Slovakia from 1919-21.

CRANE, STEPHEN (1870-1900), Amer. novelist; *The Red Badge of Courage*, 1895, is a series of war sketches; war correspondent in the Greco-Turk., 1897-8 and Span.-Amer. 1898, wars; other works include *The Little Regiment*, 1897; *Wounds in the Rain*, 1900, and *The Monster*, 1901.

CRANE, WALTER (1845-1915), Eng. artist; chiefly famous for decorative work and book illustrations, all marked by strong individuality; also successful writer and lecturer upon art.

CRANE, WILLIAM H. (1845), American actor. Appeared with Stuart Robson, Park Theater, New York, in Our Boarding House, followed by numerous successes, including the two Dromios in Shakespeare's Comedy of Errors, ending with The Henrietta. Appeared in star roles in The Senator, On Probation, The American Minister, A Virginia Courtship, Fool of Fortune, The Head of the Family and Brother John and others. Appeared for three years as David Harum in a dramatization of Edward Noyes Westcott's book of that name, followed by The Spenders, adaptation by Robert Hichens of Les Affaires son Les Affaires; The Senator Kief-House, by Martin Morton and a revival of Bronson Howard's The Henrietta rewritten and brought up to date by Winchell Smith and Victor Mapes.

CRANE, WINTHROP MURRAY (1853-1920), American manufacturer, legislator and executive, *b.* Dalton, Mass. He amassed a fortune in the manufacture of paper and engaged actively in politics as a Republican. He was elected lieutenant governor of Mass. in 1897 and was chosen governor in 1900. He served in the United States Senate from 1904 to 1913 when he retired to private life. His acquaintance with public men and events was extensive and he exerted a powerful influence in the councils of his party.

CRANIOMETRY, the measurement of skulls, for comparison of the skulls of men with those of monkeys and other animals, or for comparison of the skulls of different races and different branches of the races of mankind. There are various methods of comparing skulls, the chief being (*a*) by comparison of length, breadth, and height of the skull, the standard of maximum length being taken at 100, so that 100 x breadth length is the *breadth* or *cephalic* index, and skulls are termed, according as the cephalic index is above 80, between 75 and 80, and below 75, *brachycephalic*, *mesaticephalic*, and *dolichocephalic*; (*b*) by comparison of the amount of cubic capacity of the skull cavity, the average being 85 cubic inches; (*c*) by comparison of the degree of the angle of projection of the jaws prominent jaws signifying a lower type, the degree being termed the *gnathic index*.

CRANK, arm or U-shaped part fixed at right angles to a shaft or axle by which circular motion may be converted into reciprocating motion and *vice versa*. Originally meaning crooked, the term is also popularly applied to extreme faddists or monomaniacs.

CRANER, THOMAS (1489-1556), Eng. ecclesiastic; *b.* at Aslacton, Nottinghamshire; became fellow of Jesus Coll., Cambridge; made Archdeacon of Taunton; took advanced step for churchman of marrying, 1532; like many Eng. abp's, was consecrated Abp. of Canterbury (1533) without having previously held high office in Church; held court and pronounced king's marriage invalid May 23, 1533; helped to enforce king's supremacy over Church; declared king's marriage with Anne Boleyn invalid, 1536; opposed Six Articles, 1539; carried out his Prot. views under Edward VI.; after signing recantations under Mary, died a brave death, thrusting offending hand first into flames.

CRANSTON, a city of Rhode Island, in Providence co. It is on the New York, New Haven and Hartford Railroad, and on Providence River. Several villages are included within its limits. It is the site of the State Reformatory for Boys and Girls, State Prison, almshouse, insane asylum, workhouse, etc. Its industries include cotton factories and a wire factory. Pop. 1920, 29,407.

CRANSTON, EARL (1840), American Protestant Episcopal Bishop. Graduated from Ohio University 1861 and from Allegheny 1882. Served in Ohio infantry and West Virginia cavalry 1861-4. Ordained M. E. ministry 1867. Elected Bishop 1896. Episcopal visitor, China, Japan, Korea, 1898-1900. Resident bishop at Washington 1904-16. Retired May 1916.

CRANWORTH, ROBERT MONSEY ROLFE, BARON (1790-1868), Eng. Lord Chancellor.

CRAPE (Fr. *crepe*), silk fabric finished both in soft and crisp forms; there is also an imitation c., made from cotton.

CRASH, technical name for roller-towel cloth.

CRASHAW, RICHARD (1613-50), Eng. poet; *s.* of a Puritan preacher, but later joined R.C. Church; wrote *Steps to the Temple*, 1646; and other religious poems.

CRASSUS, surname in Rom. plebeian *gens* Licinia. Important members are Publius, consul, 131 B.C., noted as scholar and orator; Lucius, also orator; Publius, consul, 97 B.C., author of *Sumputary Law*; Marcus is best known as *Dives* ('the rich') because of his skill in acquiring wealth. In 60 B.C. he with Cæsar and Pompey formed the 'First Triumvirate'; he was killed in war with the Parthians (53 B.C.).

CRATES (fl. 470 B.C.) Athenian comic writer and actor.

CRATINUS (fl. 423 B.C.), Gk. comic poet.

CRATIPPUS, Gk. historian who supplemented Thucydides.

CRAU (43° 36′ N., 4° 50′ E.), stony district, S. France, occupying western part of Bouches-du-Rhône.

CRAUFURD, ROBERT (1764-1812), Scot. commander; distinguished himself in Peninsular War; leading march of 'Light Brigade' (1809), and after battle of *Fuentes d'Onoro* (1811) made major-general; slain at *Ciudad Rodrigo.*

CRAVAT, lace neckcloth worn during XVII. and XVIII. cent.'s.

CRAVEN, WILLIAM (1608-97), Earl of C. (1664), Eng. Royalist; *s.* of lord mayor of London; inherited large fortune; cr. Baron C. of Hampstead Marshall, 1627; fought for Elector Palatine in Thirty Years War; assisted Charles I. with money.

CRAWFORD, FRANCIS MARION (1854-1909), an American novelist; *s.* of Thomas C. the sculptor, and nephew of the General Marion who took part in the American War of Independence. He was born at Bagni-di-Lucca in Tuscany, and spent the first eleven years of his life in Rome. He was educated at Concord, New Hampshire, at Trinity College, Cambridge, at Karlsruhe and Heidelberg. Returning to Rome at the age of twenty-two he studied the oriental languages, and in 1873 undertook press work at Allahabad in connection with the Indian Herald. Falling ill, he went to live in New York with his uncle, Mr. Samuel Ward, who was to become the hero of the novel *Dr. Claudius.* Later he traveled in America and Turkey. His first novel, *Dr. Isaacs*, appeared in 1882, and following it came *Dr. Claudius, A Roman Singer, An American Politician, Zoroaster, Saracinesca, Marzio's Crucifix, With the Immortals, The Ralstons, Casa Braccio, A Rose of Yesterday, Don Orsino, Sant Ilario*, etc. He wrote also a play, *Francesca da Rimini*, produced in Paris, 1902, and a historical work, *Ave Roma Immortalis.* Marion C. joined the Roman Catholic Church.

CRAWFORD, THOMAS (1814-57), American sculptor, *b.* New York City. At Rome, where he passed a great part of his life, he studied under Thorvaldsen and other famous sculptors. Some of his figures were of heroic size, as *The Genius of America*, that stands on the dome of the Capitol at Washington, and the equestrian statue of Washington at Richmond, Va. Among his most notable sculptures are *Mercury and Psyche, The Indian, Flora, Dancing Jenny, Adam and Eve, Orpheus and Cerberus* and *Hebe Ganymede.* He also worked extensively in bas-relief.

CRAWFORD, WILLIAM HARRIS (1772-1834), American lawyer and statesman, *b.* Amherst co., Va. He was admitted to the bar in 1798 and practiced in Lexington, Ga. He was elected to the United States Senate in 1807 and re-elected in 1811, serving as president pro tem of that body in 1812. In the following year he was appointed minister to France. In 1815 he entered the Cabinet as Secretary of War and the next year became Secretary of the Treasury, which position he held until 1825. He was nominated for the Presidency in 1824, receiving 41 electoral votes. From 1827 until his death he was judge of the northern circuit of Georgia.

CRAWFORD, WILLIAM HENRY (1855), American educator; *b.* Wilton Centre, Ill. He graduated at Northwestern University in 1884. He spent five years in the Methodist ministry, and in 1889 became professor of the history of theology in Gammon Theological Seminary. Four years later he was chosen president of Allegheny College, Meadville, Pa.

CRAWFORDSVILLE, a city of Indiana, the county seat of Montgomery co. It is on several important railroads. It has a large agricultural trade and many important industries. It is the seat of Wabash College. Pop. 1920, 10,139.

CRAYFISH (*Astacus*), widely distributed fresh-water crustaceans of the order Marcura, resembling lobsters.

CRAYON, colored chalk used for drawing. Crayon, or pastel drawing, first came into use during XVII. cent.

CREAM OF TARTAR, or POTASSIUM HYDROGEN TARTRATE ($C_4H_5O_6K$), a substance occurring in a crude form in the later stages of the fermentation of grape-juice. This product is known as 'argol,' and is found deposited on the sides of the cask in which the fermentation has taken place. It is dissolved in hot water, the solution is filtered and the pure C. of T. crystallized out. C. of T. is used in medicine as a purgative, and is often used as the acid element in baking powder.

CREASY, (SIR) EDWARD SHEPHERD (1812-78), English historian, *b.* Bexley, Kent. He received his education at Eton and Cambridge and was admitted to the bar in 1837. He was made professor of history in London University in 1840 and chief justice of Ceylon in 1860, in which year the honor of knighthood was conferred upon him. His publications include *Rise and Progress of the British Constitution*, 1834; *History of the Ottoman Turks*, 1854-56; and *A History of England*, 1869-70. His fame rests chiefly however on his *The Fifteen Decisive Battles of the World*, published in 1851, which has become a classic of the English-speaking world.

CREATIONISM, the theory that each individual human soul is separately created, as opposed to *Traducianism*, the doctrine that human souls are propagated by generation.

CREBILLON, PROSPER JOLYOT DE (1674-1762), Fr. tragic dramatist; wrote *Atree et Thyeste*, *Rhadamiste et Zenobie*, *Pyrrhus*, *Catilina*, *Le Triumvirat*, etc. His *s.*, Claude (1707-77), was a novelist.

CRÈCHE (Fr. 'cradle'), public nursery where children of working mothers are cared for during the day either free or on payment of small fee.

CRÉCY (50° 16′ N., 1° 52′ E.), village Somme, France, near Abbeville; famous for victory of English under Edward III. and Black Prince over Philip VI.'s forces, Aug. 26, 1346; Fr. army suffered terrible losses.

CREDENCE TABLE, small side-table, used in churches, upon which the Eucharistic vessels and unconsecrated elements are placed.

CREDENTIALS, letters of authority which ambassadors and similar officials carry to foreign courts.

CRÉDIT FONCIER, system employed in France for raising money by mortgages.

CRÉDIT MOBILIER OF AMERICA, a joint stock company whose operations in building the Union Pacific Railroad in the sixties of the nineteenth century produced a legislative scandal that has been viewed as the worst in American history. The company obtained a charter from the government to build the line, and received considerable government aid for doing so, both in loans and land grants. It was recorded that the building of the line had cost the Credit Mobilier $50,720,958, while the government's contribution amounted to $94,650,287, leaving a profit of $43,929,328. The cost of the line was thus not much more than half of what the government paid, and the huge profit was all gained in two years. The Credit Mobilier stock, almost worthless, rose to several hundred points and paid enormous dividends, reaching to more than 500 per cent. To quiet suspicions in Congress and in official circles that the government had been thoroughly bled in aiding the construction, Credit Mobilier stock was sold to representatives and government officials and they reaped the benefit of the swollen dividends. The scandal figured in the presidential campaign of 1872, and a long investigation of the whole affair was undertaken by the Senate and House. It was clear that the Credit Mobilier stock had been freely offered—in some cases refused, in others accepted—as bribes to influence legislators' votes, but the enquiry did not result in any action.

CREDITON (50° 47′ N., 3° 39′ W.), market town, near junction of Creedy and Exe, Devonshire, England; has fine old cruciform church; traditional birthplace of St. Boniface, apostle of Germany; boots and shoes. Pop. 4,000.

CREDNER, CARL HERMANN (1841), Ger. geologist; *s.* of Heinrich C. (1809-76), the authority on Thuringian geology; prof. of Geol., Leipzig; director of geological survey of Saxony.

CREE, N. Amer. Ind. tribe inhabiting parts of Manitoba.

CREEDS (Lat. *credo*, 'I believe'), terms for forms of statement of articles of belief in Christian Church, there being three, the Apostles', Nicene, and Athanasian. *Apostles' Creed* is not found in Bible. In first days of Christianity the only confession of faith needed for baptism into the Church was recognition of Jesus as Son of God. The earliest appearance of form resembling present Apostles' Creed is found in Epistle of Ignatius, Bishop of Antioch, to Trallians; regarded by some critics as parent of later creeds, but it is generally held that 'Old Roman Creed' is archetype. Epiphanius related that Marcellus, exiled Bishop of Ancyra, brought the Old Roman Creed from Ancyra, 340, but Ussher showed that it was previously known in Rome; many of its phrases occur in articles of faith cited by Tertullian in 2nd cent. and by bishops Felix and Dionysus in 3rd cent.; put into writing at close of 4th cent., when it closely resembled later authorized form which occurs, 730, in treatise of Pirminius, Abbot of Reichenau; recognized as authoritative by Charlemagne. Controversy has raged as to whether eastern creeds are coeval with western or were derived from Rome or Antioch.

Nicene Creed was first drawn up by Œcumenical Council at Nicæa, 325, which met to settle Arian question regarding the person of Christ, the party opposed to Arius having as champion Athanasius of Alexandria. This creed embodied articles of Creed of Eusebius of Cæsarea (a form of the Apostles' Creed), with interpretative interpolations directed against Arianism. It was however, a revised creed presented by Cyril of Jerusalem at the Council of Constantinople, 381, which some time after the Council of Chalcedon, 451, received the name.

The so-called *Athanasian Creed*, otherwise and more correctly called, from its first words, the *Quicunque vult*, is not the work of Athanasius, the opponent of Arius. Quotations from it can be traced in the sermons of Cæsarius of Arles, 6th cent., and there are some grounds for believing that it originated in 5th cent. From early 9th cent. it has been used as a canticle.

CREEK, narrow inlet in coast line of the sea; small inlet formed by mouth of stream; in Australia and America a small river.

CREEK INDIANS, N. Amer. Ind. tribe now inhabiting Oklahoma.

CREEL, GEORGE (1877), American journalist. Public school education. Editor Kansas City Independent, 1899-1909; Denver Post, 1909-10; Rocky Mountain News, 1911-13. Author of *Quatrains of Christ*, *Children in Bondage*, *Wilson and the Issues*, 1916; *How We Advertised America*, 1920; *The War, the World, and Wilson*, 1920; also various pamphlets and contributions to leading magazines.

CREELMAN, JAMES (1859-1915), American journalist and war correspondent, *b.* Montreal, Canada. He was connected with the New York Herald as editorial writer and correspondent from 1877 till 1892, when he became editor of the New York Evening Telegram. He was war correspondent for the New York World in the Chinese-Japanese War, 1894, and for the New York Journal in the Greco-Turkish, 1897, and Spanish-American, 1892, wars and during the Philippine insurrection of 1899. From 1900 to 1906 he was a special writer for the New York World, and from 1906 till 1910 was associate editor of Pearson's Magazine. In the three years following, he performed valuable public services as member of the New York Board of Education and as president of the Municipal Civil Service Commission. He published *On the Great Highway*, 1901; and *Eagle Blood*, a novel, 1902.

CREEVEY, THOMAS (1768-1838), Eng. Whig politician.

CREFELD, KREFELD (51° 21′ N., 6° 33′ E.), town, in Prussian Rhineland; principal seat in Germany of velvet and silk manufactures; has famous technical weaving school; here Ferdinand of Brunswick defeated the French, June 23, 1758. Pop. 125,000.

CREIGHTON, MANDELL (1843-1901), Eng. historian; wrote *History of the Papacy*; joint founder of *English* istorical Review,* 1886; prof. of Ecclesi- stical History, Cambridge, 1884; bp. f Peterborough, 1891; bp. of London, 897; author of *Tudors and the Reforma- on, Age of Elizabeth, Wolsey,* and many ther books on history. *Life and Letters f Creighton,* by his wife, 2 vols., 1904.

CREIGHTON UNIVERSITY, Roman atholic educational institution at maha, Nebraska, chartered in 1878. eside the ordinary college course, the niversity has a preparatory depart- ent and colleges of law and dentistry. n 1923 it had 1,408 students, and a aculty of 153 teachers.

CREIL (49° 15′ N., 2° 28′ E.), town 0 m. N. of Paris, France; iron-founding. op. 9,000.

CRELL, NICHOLAS (1551-1601), hief counsellor to Christian, Elector of axony.

CREMA (45° 21′ N., 9° 41′ E.), town, remona, Italy; manufactures linen, ilk. Pop. 9,800.

CREMATION, the burning of the ead; in ancient times, probably regard- d as special honor; in modern Europe ates from 1869, Italy, 1882, England; any crematoria are now in operation ver civilized world. The Woking crema- orium is the property of the Cremation oc. of England. Cremation Act of 902 enables any burial authority to rovide and maintain a crematorium, nd empowers secretary of state to make egulations (made in 1903) for controlling he cremation of human bodies. Two ypes of furnace are used—the rever- eratory and the regenerative, latter ends itself better to the collection of he ashes. Time occupied in reducing n average body to about 5 lb. weight f ashes, about an hour and a half.

CREMBOURG. See KREMBOURG.

CREMERA, JAKOBUS JAN (1837- 0), Dutch novelist.

CREMERA (42° 3′ N., 12° 23′ E.), mall river, Etruria, Italy; enters Tiber.

CREMIEUX, ISAAC MOÏSE (1796- 880), Fr. statesman.

CREMONA (45° 8′ N., 10° 1′ E.), apital of C. province, N. Italy, on Po; umerous old churches and palaces; hief buildings—cathedral, Sant' Agos- ino, Campo Santo, Palazzo Reale with Museo Civico); manufactures silk, otton, musical instruments; famous iolins by Amati, Stradivarius, and uarneri were made here. C. was elebrated for its school of painting uring XVI. and XVII. cent's. Pop. 3,000.

CREMONA, LUIGI (1830-1903), Ital. mathematician; eminent authority on higher geometry and mathematical teaching; successively prof. in Bologna, Milan, and Rome.

CREMORNE GARDENS, formerly a popular place of amusement, on left bank of Thames, near Battersea Bridge, London.

CRENELE, CRENELLE, embrasure in battlements, alternating with a merlon.

CREODONTA, extinct, primitive small brained Carnivora of Eocene and Oligocene strata, with probable affinities to Marsupials and Insectivora.

CREOLE, one born in West Indies, Louisiana, or S. America, of pure European, usually Spanish or French, blood.

CREON (classical myth.).—(1) S. of Lycæthus, king of Corinth; (2) king of Thebes, whose *s.*, Hæmon, was betrothed to Antigone.

CREOPHYLUS OF SAMOS, early Gk. epic poet.

CREOSOTE, colorless, oily, refractive liquid, of strong antiseptic properties, burning with a sooty flame; distillation product of wood tar, coal, and shale. It is a mixture of various phenols, methyl ethers of pyrogallol, etc.

CREPUSCULAR, connected with twilight; obscure; animals that feed at twilight.

CREQUY, a Fr. noble family, prominent from X. to XVIII. cent's. Charles de Blanchefort (1578-1638), Marquis de C. and his son, François (1625-87), Chevalier de C., were marshals of France, François being almost as famous as Turenne and Conde. François was the *f.* of two distinguished generals.

CRERAR, JOHN (1828-89), American business man and philanthropist, *b.* New York City. He accumulated a large fortune in mercantile undertakings, to which he added later by railway financiering in Chicago. He was a munificent donor to educational and charitable institutions, and at his death left large sums to such organizations besides a gift of $2,500,000 to found the John Crerar Public Library in Chicago, making a provision that all sensational novels and skeptical works should be excluded from its shelves.

CRESCENDO, in music, a gradual increase in loudness; represented by the sign < or by the abbreviation *cres.*

CRESCENT, the shape of the moon in her first quarter; hence any figure of similar shape, as a curved row of buildings; figure of heraldry; emblem of Diana; symbol of Turks and Muslims; Turk. order or decoration for distinguished foreigners.

CRESCIMBENI, GIOVANNI MARIO (1663-1728), Ital. poet and critic.

CRESILAS, Cretan sculptor; contemporary of Pheidias.

CRESOLS, METHYL PHENOLS $(C_6H_4.CH_3.OH)$, three isomeric oily compounds. A mixture of ortho-, meta-, and para-cresol; when vaporized it is used to reduce paroxysms in whooping-cough.

CRESPI, DANIELE (1590-1630), Ital. artist; work chiefly historical.

CRESS, term for quick growing cruciferous plants, cultivated for salads, the best known kinds being the garden cress (*Lepidium sativum*) and the water-cress (*Nasturtium officinale*). So-called 'nasturtiums,' flowering garden plants, are really species of Tropæolum.

CREST, in heraldry, the cognizance worn on knight's helmet; placed above it in armorial bearings.

CRESTON, a city of Iowa, in Union co., of which it is the county seat. It has machine shops, car works, planing mills and a cold storage plant. There is a public library, an Elks' Home, and other public buildings. Pop. 1920, 8,034.

CRESWICK (37° 25′ S., 143° 27′ E.), town, Victoria, Australia; gold mines.

CRETACEOUS SYSTEM, the highest division of secondary of Mesozoic strata, lying conformably (*i.e.*, the original planes of the strata being parallel) on the Jurassic rocks, and overlaid unconformably by the Lower Eocene system. It derives its name from the Anglo-Fr. chalk rocks (Lat. *creta*) which form its most conspicuous feature. It has been possible to characterize certain zones or stages by the distinctive fossil species, especially Foraminifera and Cephalopoda, found in them. Above is a rough classification of the principal stages corresponding to cretaceous formations throughout the world, while numerous sub-stages are particularly of local value. The cretaceous system is well developed in Britain, Central and S. Europe, W. Asia, N. Siberia, Japan, the Moluccas, N. Australia, New Zealand, N. and E. Africa, N. and S. America (especially on the W. side). See GEOLOGY.

CRETINISM, disease due to congenital absence of the thyroid gland or its functions, arising in early childhood. It is endemic in certain districts, especially in some of the valleys Switzerland, Derbyshire being the pa of England where it is most commo and it is found all over the world.

CRETONNE, printed cotton clot similar to chintz, but heavier.

CREUSE (46° 2′ N., 2° E.), depa ment, Central France; chief riv Creuse; surface hilly; climate cold a damp; soil poor, except in valleys, whe leading industry is cattle and she rearing; coal found; principal products chestnuts, potatoes, fruit. Area, 2,1 sq. miles. Pop. 1921, 228,344.

CREVASSE, deep fissure in a glaci breach in the bank of a river, especia 'levee' of the lower Mississippi.

CREVILLENTE (38° 15′ N., 0° 4 W.), town, Alicante, Spain; famed melons. Pop. 11,000.

CREWE (53° 7′ N., 2° 27′ W.), tow Cheshire, England; important juncti station of London & N. W. Railwa has extensive railway workshops. Po 1921, 46,477.

CREWE, MARQUIS OF, ROBE OFFLEY ASHBURTON CREW MILNES (1858), Brit. statesm (Liberal); *s.* of Lord Houghton; Lo Lieut. of Ireland, 1892-95; Lord. Pr of the Council, 1905-8; Sec. of State Colonies, 1908-10; Sec. of State India, 1910-15.

CRIB, child's bed, with raised sid a trans., or key, of a school text-boo slang term for stealing, and also for a po or employment.

CRIBBAGE, game played with a co plete pack of fifty-two cards, a c. boa and four pegs for scoring. It is usua played between two persons, and t game is 61 up.

CRICCIETH (52° 56′ N., 4° 14′ W watering-place, Cardigan Bay, Ca narvonshire, Wales.

CRICHTON, JAMES, 'THE A MIRABLE CRICHTON' (1560-*c.* 158 Scot. scholar, whose versatility has b come proverbial; *s.* of Robert C., Lo Advocate of Scotland; tradition stat that he successfully carried on a deba in twelve languages in Paris, and ne day won a match in a tourname outstanding philosopher, mathematici theologist; composer of Latin verses fine swordsman; a man of great beau killed in a street brawl.

CRICKET (Gryllidæ), family of thopeterous insects allied to the Locus dæ; long hind legs used for jumpi the males give their characteristic ch by rapidly rubbing ridges of the nervu

the wing cover across nervure of
posite wing; varieties are the field
house c., and mole c., the latter
apted for burrowing with its strong
ovel-like fore legs.

CRICKET, open-air game played by
o sides of eleven players each, with
ts, ball, and wickets, a batsman de-
ding the wickets against the ball
wled by a player on the other side,
ile the other members of the bowler's
e are in different positions in the
ld to catch the ball. The object of the
tsman is to make as many runs as
ssible between the wickets after he
s struck the ball, before his wickets
e put down by the ball on its being
urned by one of the opposing players.
e game in its present state has been
veloped from an old game played in
gland in the 12th cent., and the game
mentioned—from 1593 under the
me of 'krikett'—in a number of
rks up to the commencement of the
th cent., from which time its history
n be easily followed. At this period
gering on the game was common,
ge sums of money changing hands
er the results of matches. Public
inion gradually discountenanced such
tting. The famous Hambledon Club
s founded in 1750, and lasted until
91. The Marylebone Cricket Club
.C.C.) arose on the breaking up of
e White Conduit Club in 1787, and
yed matches on the first ground
own as Lord's, at what is now Dorset
uare, in Marylebone, removing after-
rds to near Regent's Park, and in
07 to St. John's Wood, the present
rd's ground.
The first laws of the game were drawn
by the London Club in 1744 and
ised by the M.C.C. in 1788; the
ter club remained thenceforth the
ing authority of the game up to the
sent day, the rules having been
ised and altered by it from time to
ne.

CRIEFF (56° 22′ N., 3° 50′ W.), town
nmer resort, on river Earn, Perth-
re, Scotland; manufactures woolen
ods; Drummond Castle, famous for
uty of its gardens, is in neighborhood.
p. 6,000.

CRIMEA, peninsula, Taurida republic,
ssia (45° 20′ N., 34° 15′ E.), between
ck Sea and Sea of Azov, joined to
inland by isthmus of Perekop; area,
0,000 sq. m. Balaklava and Sevasto-
have good harbors; Theodosia and
rvorossisk are ice-free. Crimea is
ided into two regions by the Salgir,
largest river; in N. pastureland; in
mountains, forests, and health re-
ts; here Crimean War was fought.
Products include grain, tobacco, wines, and fruit. Crimea was held by Turks from 1475; taken by Russians 1783; seaports were frequently bombarded during World War; was overrun by Bolsheviks after collapse of Denikin's army, 1920. See MAP OF RUSSIA.

CRIMEAN WAR (1853-6), European war so called from seat of final actions. Russia proposed to Britain, 1844, division of territories of Turkey, 'the sick man of Europe,' and seized Moldavia and Wallachia, 1853, with result that Turkey declared war; Brit. and Fr. fleet sailed to Bosporus to overawe Russia; Turk. fleet destroyed at Sinope, 1853, and Britain and France declared war, 1854; Sardinia joined Allies; 1855. Baltic campaigns took place, 1854-5, and the coasts were blockaded.

Russian fleet took refuge in Sevastopol harbor on Black Sea. As Turks were found able to defend European Turkey, where first allied contingents were sent, it was decided to attack Sevastopol by land; allies landed, Sept. 1854, 30 m. N. of Sevastopol; after victory above heights of Alma, where Russian force blocked way, flank march was made to Balaklava harbor, within sight of Sevastopol, and connection established with allied fleet; battle of Balaklava in Oct. memorable for heroic charge of Brit. Light Brigade, two-thirds of which were slain; battle of Inkerman in November called the 'soldiers' battle,' from disorganized fighting; heavy losses but total defeat of Russians; army closed on Sevastopol; siege of nearly a year; wretched commissariat conditions prevailed; nursing arrangements were organized by Florence Nightingale. French stormed Malakoff fort, Sept. 1855, and Russians streamed out of Sevastopol; war ended with Peace of Paris, 1856, by which Russia restored conquests, and engaged to build no arsenals and have no warships in Black Sea.

CRIMINAL LAW. A crime is an act, whether omission or commission, punishable by law in the interests of the community. As an example of a crime by simple omission, the neglect of children by their parents or guardians may be mentioned. For an act to be a crime it is necessary that the doer shall have a genuine intention to do the act. This criminal intention is generally referred to as 'the guilty state of mind,' and unless this is present the law does not regard the act as a crime, except in certain cases where the law says that the doing of an act is a crime irrespective of the intention of the wrong-doer—(*e.g.*) offenses against the licensing laws, committing nuisances, and the like. When a criminal intention is present, the person is said to be actuated by malice. Breaches of the criminal law are divisible into (1) offenses punishable upon summary conviction—(*i.e.*), without the offenses—(*i.e.*), such crimes as can only be adequately punished after trial by jury. Children under seven years of age are held incapable of committing a crime; also from that age up to fourteen years, unless it can be shown that the child has sufficient capacity to know that the act is wrong. No act committed by a lunatic is a crime; but the law presumes every person to be sane and responsible for his acts until the contrary is proved. The absolving by order of the court of a person tried for a criminal offense is termed *acquittal*.

In English and American law crimes are divided into 'felonies' and 'misdemeanors'. The difference] between them does not depend on their gravity or seriousness; it is purely historical. Felony was in past times an act for which a man lost or gave up his 'fee' or estate. The only practical distinction between felony and misdemeanor is that for felony arrests may be made by private persons acting without judicial authority. The chief felonies are murder, treason, arson, rape, and theft. The word 'misdemeanour' may be said to apply to all those crimes and offenses for which the law has not provided a particular name; intervention of a jury; and (2) indictable.

CRIMMITZSCHAU, KRIMMITSCHAU (50° 49′ N., 12° 28′ E.), town, on Pleisse, Saxony, Germany; chief industries, manufacture of buckskin and wool spinning. Pop. 28,000.

CRIMP, one who undertakes to supply men for the army and navy without authority; extortionate keepers of sailors' lodging houses; formerly applied to persons who decoyed, drugged, and kidnapped men for the sea or military service.

CRINAGORAS OF MYTILENE (fl. 45-26 B. C.), Gk. epigrammatist.

CRINOLINE, originally horse-hair cloth used to stiffen women's skirts; later a bell-shaped underskirt with steel hoops; became fashionable about 1856.

CRIPPLE CREEK, a town in Colorado, in El Paso co. It is on the Florence and Cripple Creek, and the Midland Terminal railroads, 50 miles west of Colorado Springs. It is the center of the Cripple Creek mining district which formerly was one of the richest gold mining districts in the country. There are cyanide mills, smelters and other industries connected with mining. The city was founded in 1890, and in 1896 was nearly destro by fire. Pop. 1920, 2,325.

CRISA, CRISSA (*c.* 38° 28′ N., 27′ E.), city, Phocis, ancient Gre S. W. of Delphi.

CRISP, CHARLES FREDERI (1845-1896), American jurist and le lator, *b.* Sheffield, England. He brought by his parents to the Uni States while a child. He was in Confederate Army, 1861-64, entered the practice of law in 1866 and judge of the Georgia Supreme Co from 1877 to 1882. In the latter yea was elected to Congress, where served until his death, fourteen ye later. He was Speaker of the House Representatives for two consecut terms, 1891-95.

CRISPI, FRANCESCO (1819-19 Ital. statesman; took popular part Sicilian revolution, 1848, in Maz plot at Milan, 1853, and in Gariba movement, which he organized, 18 minister of interior, 1877; suppor monarchy as means of Ital. unity, worked to make Rome real capi became chief minister, 1887, and such opposed firm front to France.

CRISPIN, the patron saint of sh makers. According to legend, two R brothers, Crispin and Crispinian, set at Soissons, in Gaul, and were headed, 287, for preaching the gos During their mission they suppor themselves as shoemakers. The ba of Agincourt was fought on the anni sary of St. Crispin's Day, Oct. 25, 14

CRISIS, ECONOMIC, or **EC NOMIC DEPRESSION,** a period du which the industrial and commer system becomes sluggish and results financial pressure on the populati This phenomena is peculiar to indust countries, and may be said to b characteristic of our present cha system of private industry. The ca have been assigned to various reaso chiefly to 'over-production.' Manu turing establishments produce in grea quantities than is demanded by consumers, and stores of goods accu late. Manufacturing then slackens, the workers are thrown out of wo Being deprived of their earnings, th being of the bulk of the consum become still less able to acquire of surplus, a 'vicious circle' being t created. This further curtailment consumption brings about a furt check in other fields of manufactu and thus depression progresses, unt crisis is reached, usually resulting labor and social unrest, threate revolution, etc. Eventually the surp stocks are disposed of, sometimes at a material loss to the manufacturers, and the wheels of industry again begin to turn, bringing about an upward tendency in the situation. Some economists contend that these periods of depression are automatically periodical, with from ten to twelve years between each crisis. In the United States they have occurred in 1814, 1818-19, 1837, 1857, 1873, 1884, 1889, 1903, 1907, 1914 and 1922-23. The depression of 1914 was interrupted by the oncoming of the World War, when the abnormal demands of European countries created an abnormal prosperity in this country during the war period. The depression of 1922 may therefore be said to have been caused by the deflation following the period of artificial prosperity.

CRISSEY, FOREST (1864). Public school education. Began newspaper work as a country correspondent and was subsequently a reporter and special editorial and feature writer with various papers, mostly located in Chicago, until 1900 when he became special editorial reporter for the Saturday Evening Post in Philadelphia. Contributed to various magazines and was the author of, *The Country Boy*, 1897; *In Thompson's Woods* (poems), 1901; *Tattlings of a Retired Politician*, 1904; and *The Story of Foods*, in 1917.

CRISSINGER, DANIEL RICHARD (1860). Graduated from Buchtel College, Akron, Ohio, 1885, and received his LL.B. from the University of Cincinnati in 1886. Started practicing law at Marion, Ohio, in 1886 and served as prosecuting attorney of that city for two terms. In addition to being the general counsel of the Marion Steam Shovel Co., which position he held for twenty-two years, he was president of the National City Bank and Trust Company, Marion, Ohio, 1920, and in 1921 was made Comptroller of the Currency. In 1923 he was appointed by President Harding to post of Governor, Federal Reserve Board of Federal Reserve Bank.

CRITICISM, the art of expressing an unbiased judgment, particularly in relation to lit. or the fine arts. Aristotle, by virtue of his *Poetic* and *Rhetoric*, may be regarded as the pioneer of literary c. amongst the ancients, though Plato and some earlier Gk. writers had produced works somewhat in the nature of c. Longinus, a later Gk. critic, wrote *On the Sublime*, one of the greatest critical books of the world. Quintilian, at a later date, took high rank as a literary critic. Ital. c. began with Dante's *De Vulgari Eloquio*, and was continued by many Ital. writers in XVI. cent. In XVII. cent. France took up neoclassic c., and its influence reached England. In England literary c. began about the middle of the XVI. cent., and much critical work of a very high character was produced during the three cent's following, amongst the leading writers being Dryden, Johnson, Hazlitt, Coleridge, Ruskin, Matthew Arnold, to name but a few. Lessing's critical writings hold an important place in Ger. lit.; and amongst great Fr. critics may be named Malherbe, Boileau, Voltaire, Diderot, Sainte-Beuve, and Taine.

CRITICISM, BIBLICAL. See BIBLICAL CRITICISM.

CRITTENDEN, JOHN JORDAN (1787-1863), Amer. lawyer and statesman; Attorney-General, 1841; gov. of Kentucky, 1848-50; strong upholder of the Union, but advocated concessions to Southerners. His *s.*, George Bibb, 1812-80, was distinguished Confederate general, and another *s.*, Thomas Leonidas (1815-93), was a lawyer and Federal general.

CRITTENDEN, THOMAS LEONIDAS (1819-93), American lawyer and soldier, *b.* Russellville, Ky. He studied law and was made State Attorney for Kentucky in 1842. He served with credit as an officer in the Mexican War and at the outbreak of the Civil War entered the Union service as brigadier general of volunteers, being promoted to a major generalship in 1862. He did brilliant work at Stone River, Shiloh and Chickamauga.

CROATIA- SLAVONIA, dist. of Jugo-Slavia (45° N., 18° E.); bounded by Adriatic on S. W. and separated from Hungary on N. E. by rivers Drave and Danube; mountainous, with plains in N. E. Has mt. ranges—Velebit Planina and Kapela—and includes portion of highlands known as the Karst (famous for deep valleys and subterranean watercourses); farther inland are Eastern Alps. There are extensive marshes. Area is intersected by the river Save. Earthquakes are frequent in Agram district.

Soil is fertile; staple crops are wheat, maize, pulse, potatoes, flax, hemp, tobacco, etc. Wine is largely produced, and a peculiar plum brandy. Timber is an important product. Swine are reared in the oak forests of Slavonia; and cattle, sheep, and horses are bred. Agriculture is the main industry. There are no extensive manufactures, but cotton and beautiful silk fabrics are produced.

About 90 per cent of inhabitants are Croats and Serbs; there are a good many Germans, but few Hungarians. About 75 per cent of people are R. C.; only other church of any standing is Gr. Church. Croatian dialects belong to the Slavonic branch of Indo-European languages; the literary tongue (Serbo-Croatian) is the same as in Serbia. Cap. Angram (Zagreb). Area, 16,418 sq. m.; pop. 2,700,000.

History.—The Croats, a Slavonic tribe invaded area in 7th cent.; maintained an independent kingdom (10th and 11th centuries); subject to kings of Hungary (12th to early 16th century); from 1526 partly Turkish, partly Austrian; in 18th cent. almost entirely subject to Austria; as 'Illyrian Provinces' partly under Fr. rule, 1809-13; great national movement begun against Hungarian domination, 1840; constitutional struggle of Serbo-Croats against other races of Austria-Hungary resulted, Oct. 30, 1918, in proclamation of independence, and national council announced creation of Jugo-Slavia. See MAP CZECHO-SLOVAKIA.

CROCKETT, DAVID (1786-1836), popularly known as 'Davy' Crockett, American pioneer, soldier and legislator; *b.* Limestone, Tenn. His life was full of daring exploits and hazardous adventures. He fought in the Creek War under Andrew Jackson and was a member of the Tennessee Legislature in 1821 and 1823. He served two consecutive terms in Congress, 1826-30, and though defeated in 1830 was reelected in 1832. He served in the war for Texas independence and was one of the defenders of the Alamo when, after a heroic defense, it was stormed by the Mexicans in 1836. He was one of only six survivors, and all were shot by order of the vindictive Santa Anna. Although illiterate he dictated several publications, including *A Narrative of the Life of David Crockett*, 1834; *A Tour to the North and Down East and Exploits and Adventures in Texas.*

CROCKETT, SAMUEL RUTHERFORD (1860-1914), Scotch novelist, *b.* Little Duchra, Galloway. He was educated at Edinburgh and Oxford and chose the ministry as a profession. He held a pastorate at Penicuik as a minister of the Free Church of Scotland for several years succeeding 1886, but the success met with by his first books led him to devote himself chiefly to literature. He was a most prolific writer, publishing over 50 novels, the scenes of which are for the most part laid in the Galloway district with which he was so familiar. Among them are included *The Lilac Sunbonnet*, 1894; *The Men of the Moss-hags*, 1895; *Lad's Love*, 1897; *The Black Douglas*, 1899; *Joan of the Sword Hand*, 1900; *The Cherry Ribbon*, 1906; *The Moss Troopers*, 1912; and *Sandy's Love Affair*, 1913.

CROCODILE. See CROCODILIA.

CROCODILIA, order of carnivorous freshwater reptiles including crocodiles, alligators, and gavials. The true crocodiles may attain a length of about 20 feet, and occur in Africa, tropical Asia, Central America, and W. Indies. A kind of plover was said by Herodotus to be associated with the Nile c., by getting food from its teeth and warning it of danger. The alligators have shorter and broader heads, and occur in N. and S. America. The huge gavials or gharials have long snouts, and occur in India. Fossil c. are known from ancient Triassic strata onwards.

CROCOITE ($PbCrO_4$), reddish crystallized mineral, occurring in the Urals, Philippines, Tasmania, and Mashonaland. The element chromium was discovered by Vauquelin's assaying of c.

CROCUS, genus comprising about 70 species, of hardy cormous plants of the order Iridaceæ. Many varieties are cultivated for spring, autumn, and winter flowering.

CRŒSUS (560-546 B.C.), the last King of Lydia, of the Mermnad dynasty *s.* of Alyattes. He conquered the Ionian, Ælina, and other neighboring tribes, till his empire finally extended from the N. and W. coasts of Asia Minor to the R. Halys on the E. and the Taurus Mts. in the S. His enormous wealth was proverbial, and the phrase 'a perfect Crœsus' still survives. For the legend of his interview with Solon; see Herodotus, i. 29. After the overthrow of the Median empire (549), the kings of Lydia and Babylonia leagued together against Cyrus of Persia. The Delphic oracle gave C. the ambiguous answer that if he marched against the Persians 'a great empire would be overthrown.' This proved to be his own. He was utterly defeated near Sardis and taken prisoner, 546. Accounts of his death vary greatly: Cyrus probably spared his life. The dedication in Greek on fragmentary columns from the temple of Artemis (British Museum) are by C. See Bacchylides, iii. 23-62. Staters, or gold coins, bearing the image and superscription of Crœsus were found at Sardis by an American Archæological Expedition in 1922.

CROFT, SIR JAMES (*d.* 1590), Eng. statesman; Lord Deputy of Ireland, 1551; employed in Scot. affairs by Queen Elizabeth; twice imprisoned for treason.

CROFT, WILLIAM (1678-1727), Eng. composer; chiefly church music.

CROFTER, a small farmer who rents a small holding or 'croft'; term generally applied in N. and N.W. Scotland. Majority occupy, in separate tenancy, a small plot of arable land and combine to rent pasture on mountains. High rents, insecurity of tenure, etc., led to passing of *Crofters Act*, 1886, for their protection.

CROKER, JOHN WILSON (1780-1857), Brit. Conservative statesman and writer; said to have introduced word 'Conservatives'; typical contributor to Quarterly Review, penning condemnation of Endymion for that magazine; wrote *Stories for Children from the History of England*, model of Scott's *Tales of a Grandfather*.

CROKER, RICHARD (1843-1922), Amer. politician; leader of Tammany Hall. For many years he was the dominating figure in the political affairs of New York City, and his influence extended throughout the State, and was felt also in national politics. He voluntarily retired from leadership in 1902. and engaged in horse breeding and racing, settling down in Ireland; Derby winner (1907).

CROKER, THOMAS CROFTON (1798-1854), Irish antiquary and humorous writer; pub. *Fairy Legends, Popular Songs of Ireland*, etc.

CROLL, JAMES (1821-90), Scot. scientist; in spite of poverty and ill-health heroically strove to further science; keeper of Andersonian Museum, Glasgow; app. to Scot. Geological Survey; pub. many philosophical and geological works.

CROLY, GEORGE (1780-1860), Eng. clergyman and miscellaneous author.

CROLY, HERBERT (1869), American author, *b*. New York. He was educated at the College of the City of New York and at Harvard. He was on the editorial staff of the Architectural Record from 1900 until 1913, during six years of that time being editor in chief. He became editor of the New Republic in 1914. His publications include *Promise of American Life*, 1909; *Marcus Alonzo Hanna—His Life and Work*, 1912; and *Progressive Democracy*, 1914.

CROLY, JANE CUNNINGHAM (1831-1901), pseudonym 'Jennie June', American author and lecturer; *b*. Market Harborough, England. In 1841 she came to New York. She became editor of Demorest's Magazine in 1860 and held that position until 1887, at the same time being connected with the Cycle and the Home-Maker in an editorial capacity. She was president for 14 years of Sorosis, of which she was one of the founders. She established the New York Women's Press Club in 1889. She became professor of journalism and literature in Rutgers Women's College in 1892. Her publications include *Talks on Women's Topics*, 1863; *For Better or Worse*, 1875; and *The Women's Club Movement in America*, 1900.

CRO—MAGNON RACE, type of supposed early Neolithic man; remains found in France.

CROMARTY (57° 41′ N., 4° W.), seaport, Ross and Cromarty, on Cromarty Firth, Scotland; birthplace of Hugh Miller, geologist; fisheries.

CROMARTY FIRTH (57° 41′ N., 4° 10′ W.), inlet of North Sea, connecting with Moray Firth and extending into county of Ross and Cromarty; fine natural harbor, with two 'Sutors of Cromarty' (400-500 ft. high; *c*. 1,500 yds. apart) guarding the entrance.

CROMARTY, GEORGE MACKENZIE, 1ST EARL OF (1630-1714), prominent Scot. statesman and writer; cr. Earl of C., 1703; helped to bring about Union of England and Scotland.

CROME, JOHN (1769-1821), Eng. landscape artist; known as 'old Crome'; leader of 'Norwich school.'

CROMER (52° 56′ N., 1° 16′ E.), watering-place, Norfolk, England. Pop. 5,000.

CROMER, EVELYN BARING, EARL (1841-1917), English statesman and diplomat, *b*. Norfolk. After military studies at the Ordnance School, Carshalton and the Woolwich Royal Military Academy, he entered the army in the artillery branch in 1858. He held minor positions until 1876 when he was given the rank of major and appointed British commissioner of the Egyptian public debt office. From then until his death most of his time was occupied in Egyptian affairs in which he became an authority. He did remarkable work in rescuing Egypt from her brankrupt condition, introducing reforms, establishing vast irrigation works and alleviating the miserable situation of the people. His achievements in this field earned him the title of 'The Maker of Modern Egypt.' When he resigned in 1907, he received a grant of $250,000 from Parliament in recognition of his services. In the World War he served as chairman of the commission that investigated the Dardanelles campaign. His publications include *Modern Egypt*, 1908; *Ancient and Modern Imperialism*, 1910, and *Abbas II*, 1915.

CROMORNE, wood wind-instrument,

consisting of long straight pipe, the lower end being curved like the handle of a walking-stick; used throughout Europe XIV. to XVII. cent's.

CROMPTON (53° 32′ N., 2° 8′ W.), northern suburb, Oldham, Lancashire, England; cotton mills and collieries, Pop. 14,000.

CROMPTON, SAMUEL (1753-1827), Eng. cotton spinner; invented spinning-mule for muslin yarns.

CROMWELL, BARTLETT JEFFERSON (1840-1917), American naval officer; *b.* Georgia. He graduated from the United States Naval Academy in 1861 and immediately entered on active service with the South Atlantic blockading squadron, 1861-63, and the East Gulf squadron, 1863-65. He was made a commander in 1874, captain in 1889 and rear admiral in March of the same year. In 1901 he commanded the United States fleet in South American waters and later in the same year took command of the European station, retiring on reaching the age limit in 1902.

CROMWELL, HENRY (1628-74), Eng. administrator; younger *s.* of Oliver C.; able and reforming ruler in Ireland; made Lord-Deputy, 1657; Lieut. and Gov.-Gen., 1658-59.

CROMWELL, OLIVER (1599-1658), Lord Protector of the Commonwealth of England; *b.* at Huntingdon; great-grandson of Richard Williams, who assumed name Cromwell after patron and kinsman Thomas, minister of Henry VIII.; nephew of Sir Oliver Cromwell of Hinchinbrook, and cousin of Hampden and St. John; educated at Sussex Coll., Cambridge. He underwent long period of religious repression, which ended in 'light;' he was member for Cambridge in Short and Long Parliaments, 1640, and was already 'much hearkened unto' by anti-Episcopalians. He was foremost in securing military forces of country for Parliament, often acting without previous authorization.

Cromwell commanded under Essex at Edgehill, 1642; became colonel, 1643; and then perceiving the weakness of the Parliamentary levies in cavalry, began organizing 'the Ironsides' from men 'who made some conscience of what they did;' appointed one of four colonels of horse under Manchester, and distinguished himself at Winceby, 1643; became lieut-general and member of Committee of Both Kingdoms; assisted in capture of Lincoln and other towns; commanded left wing at Marston Moor, and with his 'Ironsides' was generally considered to be the author of victory.

A dispute now arose between Cromwell and Manchester as to ultimate aim of war; the latter, having no idea of deposing Charles, was supported by Scots and Presbyterians in his army; rest of army, composed of Puritans of various new sects, looked to Cromwell (already called 'the great Independent'), whose views went further. Cromwell persuaded Parliament to appoint committee to bring about union between Presbyterians and Independents, but at end of year charged Manchester before House of Commons with wilfully obstructing military success; Manchester, in reply, accused Cromwell of animosity to aristocratic institutions and showing favor to Independents alone. Cromwell, however, secured 'Self-denying Ordnance,' 1645, for remodeling army. Sir Thomas Fairfax was appointed general, and Cromwell (exempted from new law) lieut-general. Cromwell commanded right wing and all the cavalry at Naseby, 1645, routed king's left, completed defeat of center, and pursued flying army. When the war ended, 1646, a quarrel ensued between army and Parliament, and in June, 1647, Cromwell joined army, the king having been seized, probably by his orders, in May. A council of war corresponded with Parliament and offered terms to the king. On flight of Charles to Carisbrooke, Cromwell forced Parliament to abandon attempt at compromise; and, exasperated by second Civil War which followed, he denounced 'Charles Stewart, that man of blood.' Dissensions followed in Parliament after king's death; Pride's 'Purge' made Independents supreme, and after suppression of fanatical 'Levellers' Parliament became Cromwell's instrument.

Appointed lord-lieutenant and commander-in-chief for Ireland, Cromwell subdued Drogheda, Wexford, and great part of sea coast, 1649; ruthless slaughter or transportation avenged Prot. bloodshed by Irish; inland towns were conquered in 1650; laws against Catholicism were enforced. Cromwell was made commander-in-chief against party of Charles II. in Scotland, 1650; great victories of Dunbar, Sept. 3, 1650, and Worcester, Sept. 3, 1651, ended Civil War. Long Parliament was denounced and dismissed by Cromwell, 1653, and he as commander-in-chief became dictator. He summoned 'Little Parliament,' which introduced anarchical measures, with result that Conservative members insisted on resignation of powers to Cromwell, again dictator, whe with a council of officers, drew up tho instrument of government by which he became Protector, Dec., 1653. The Church was reformed: would-be ministers were examined by '*triers*'—Presbyterians, Baptists, and Independents alone being eligible; oaths and other vices were prohibited. The Court of Chancery was reformed also, and condition of Scotland improved. Peace was made with Holland, which submitted to Navigation Act. Cromwell championed the Vaudois, and Blake's successes against Spain led to acquisition of Dunkirk. England acquired a great name in Europe, and a large party besought Cromwell to become king; Cromwell refused the title owing to army's objection. He was buried in Westminster Abbey, but his body was exhumed and hanged at Restoration.

CROMWELL, RICHARD (1626-1712), Protector of England. 1658-59; *s.* of Oliver C., and succ. his *f.* as Protector, but being violently opposed by army was forced to retire; moderately well-gifted, but without capacity for ruling; was unmolested after Restoration, and lived as a country gentleman.

CROMWELL, THOMAS, EARL OF SUSSEX (1485-1540), English statesman; *b.* Putney, Surrey. For some years he led a roving life and then became a protege of Cardinal Wolsey, who took a special interest in advancing his financial and political fortunes. He entered Parliament in 1523, where his ability attracted attention. When Wolsey fell into disgrace in 1529, Cromwell vigorously defended his benefactor. Following the Cardinal's death, Cromwell entered the service of King Henry VIII, who rained honors and emoluments on him and used him as his tool in humbling the power of the nobles, in suppressing the monasteries and in making the royal power supreme. He lost the monarch's favor however by promoting the marriage of the king with Anna of Cleves, and on a trumped up charge of treason was sent to the block, after making piteous but unavailing pleas for mercy. While his personal character was far from admirable, he did much to advance the cause of Protestantism in England, even though just before he was beheaded he declared that he died in the faith of the Catholic church.

CRONJE, PIETRUS ARNOLDUS (1835-1911), Boer patriot and military commander; *b.* near Pretoria. A farmer, like most of the Boers, he was active in political affairs, became a member of the Transvaal Government and forced Sir John Willoughby's forces to capitulate after the failure of the Jameson raid in 1896. In the war with England he held command in the western zone of operations and defeated the British severely at Magersfontein. Surrounded at Paardeberg by the forces of Lord Roberts in 1900, he made a gallant resistance before he finally surrendered. The British sent him to St. Helena as a prisoner of war, permitting his return, however, after the conclusion of peace. In 1905 he visited the United States.

CRONKHITE, ADELBERT (1861), American army officer; *b.* New York City. He graduated from the U. S. Military Academy in 1882 and at the Artillery School in 1886, entering the service as 2nd Lieutenant. He rose to the rank of major general of the National Army in 1917. He served in the Cuban and Philippine campaigns and during the World War commanded the 80th Division. He did conspicuously excellent work in the St. Mihiel and Meuse-Argonne campaigns. In 1923 he retired from the service.

CRONSTADT. See KRONSTADT.

CROOK, GEORGE (1828-1890), American soldier; *b.* near Dayton, Ohio. He graduated from the United States Military Academy in 1852 and served with great distinction in the Civil War, winning laurels by his brilliant work at South Mountain, Antietam, Chickamauga and Appomattox. His fame rests mainly, however, on his work as an Indian fighter. He was commander of the military division of Idaho, Arizona and Missouri, and did notable work in the suppression of many Indian insurrections.

CROOKES (SIR) WILLIAM (1832-1919), English scientist; *b.* London. His researches and inventions in many difficult fields of physics won him distinction as one of the greatest scientists of his time. In 1855 he was professor of chemistry in Chester Training College, and four years later he founded the Chemical News. In recognition of his brilliant achievements, he was made a Fellow of the Royal Society in 1863 and since that time almost all the great scientific societies of the world have showered honors on him. He was awarded the Nobel Prize in Chemistry jointly with Buchner of Germany in 1907. Knighthood was conferred on him in 1897. The work that has won him especial celebrity was carried on in connection with high vacua, radiant matter and molecular physics. He has written widely on many subjects from science to spiritualism.

CROOKES TUBES. See WIRELESS TELEPHONE.

CROOKSTON, a city in Polk co., Minnesota, of which it is the county seat. It has railroad shops, machine shops, foundries, flour mills, tanneries, etc. Pop. 1920, 6,825.

CROP, top of plants, therefore meaning harvest; the pouchlike enlargement (ingluvies) of a bird's gullet; equivalent to outcrop (geol.); whole untanned hide; short-stocked whip with leather loop; closely cut hair.

CROQUET, game played by two or more players, who, by means of mallets, drive balls, made of wood or a composition material, and distinguished by different colors for the different players, through a series of hoops and against each of two pegs set in a particular pattern on a lawn. The game is a development from the game of *paille-maille,* originated in southern France about the XIII. or XIV. cent's, and popular in England in the time of the Stewarts, the modern game of c. being introduced from France into England about 1852, and into the United States shortly after. Forerunner of the modern game of Roque. See ROQUE.

CROSBY, ERNEST HOWARD (1856-1907), American author and reformer; *b.* New York City. He graduated from New York University and Columbia Law School and entered upon the profession of law in 1878. He served as a member of the New York State Legislature and from 1889 to 1894 was judge of the International Court in Egypt. Throughout his career he was intensely interested in social and political reforms. His publications include *Swords and Plowshares,* 1902; *Tolstoy and His Message,* 1904; and *William Lloyd Garrison,* 1905.

CROSBY, FRANCES JANE (1820-1915), an American hymn writer, born in Putnam co., N.Y. She was blind and was instructed at the New York Institution for the Blind. She published many popular poems, songs and hymns.

CROSBY, HOWARD (1826-91), Amer. Presbyterian minister, writer, and social reformer; preached total abstinence from alcohol.

CROSBY, OSCAR TERRY (1861). Graduated from U.S. Military Academy 1882 but resigned from the Army five years later. Held important positions with the Sprague Elec. Ry. and Motor Co. and with the General Elec. Co., and was later president of several electric railway and other public utility companies located in the District of Columbia, Penn., N. J. and Delaware. Made several trips of exploration including an expedition to Borneo in 1915. Was Director of the Commission for Relief in Belgium in 1915; Asst. Sec. of Treasury, in charge of fiscal bureaus in 1917 and was in Europe from 1917 to 1919 as president of the Inter-Ally Council on War Purchases and Finance. Author of *Tibet and Turkestan*; *How to Strike—Why to Strike,* 1910; *International War, Its Causes and Its Cure,* 1919, and *Electrical Railway in Theory and Practice.*

CROSIER, bp.'s crook, or pastoral staff, carried before him at religious ceremonials.

CROSS (Lat. *Crux*) is in its most usual form the intersection of two straight lines at right angles (*crux immissa*); varieties are St. Andrew's Cross (*crux decussata*); Greek Cross, where the lines intersect equally at right angles; Egyptian cross; while more elaborate crosses are Patriarchal, Lorraine, Tau, and Nowy quadrant. The cross was a constant theme in prehistoric art and an important pagan symbol. Egyptian or *Tau* Cross, is frequently found in Egyptian art; arrangement of lines seen in *swastika,* a Buddhist symbol, is found on Etruscan tombs. The cross is an anc. emblem in many countries, and was adopted as Christian symbol.

Crucifixion was the old form of punishment in East, and was early used by Romans. After crucifixion of Christ, cross at once became favorite badge of Christians, and under Constantine, to whom it is said to have appeared in a vision, obtained the place of a symbol of Christian Church. It is of great importance in Christian art, and *sign of cross* was early used for exorcism. Helena, mother of Constantine, is said to have discovered Christ's cross, and Roman Church celebrates feast of Invention of Holy Cross on May 3; but since 1895 recognition has been made of an earlier claim to its discovery than Helena's. At the feast the relic of the cross kept in the Church of St. Croce in Gerusalemme at Rome is offered to view. Feast of Exaltation of the Holy Cross (Sept. 14) is said by some to commemorate the erection of churches by Helena on the sites of her discovery and of Holy Sepulchre, by others to commemorate the day of appearance of the cross to Constantine.

Besides the crosses named, there are numerous others of various significations, amongst which are the 'Celtic Cross,' in which a circle is included in the upper portion; the 'Runic Cross,' used by the Norsemen to define boundaries, and also erected over the tombs of heroes; the twelve varieties of crosses employed in heraldry; the 'Red Cross of Geneva'; the 'Maltese Cross,' in which the ends are broadened; the cross upon coins; the Fr. Cross of the Legion of Honor, conferred upon persons of distinguished abilities; The American Distinguished Service Cross for bravery under fire; the British 'Victoria Cross' (V.C.), a bronze decoration, instituted in 1854, and awarded for valor in war; the Military Cross, instituted during the World War; the 'fiery cross' of the Scot. Highlands, consisting of small wooden cross, the extremities of which had been charred and dipped in the blood of a goat, and used for the purpose of mustering the clans. In astron. there are the 'Northern Cross,' formed by four stars in Cygnus; and the 'Southern Cross,' a brilliant star group, seen in the S. hemisphere, first reckoned a constellation in 1679.

CROSS, WILBUR LUCIUS (1862). American editor and educator. A.B. Yale 1885, Ph.D. 1889. Professor of English since 1902, Sheffield Scientific School (Yale). Dean of the Graduate School, Yale, since 1916. Author of *Development of the English Novel*; *Life and Times of Lawrence Sterne*; *History of Henry Fielding.* Editor Dept. of English Literature in New International Encyclopedia. Editor of Yale Shakespeare.

CROSS RIVER (*c.* 5° 30′ N., 8° E.), river, West Africa; rises in mountains of Kamerun, enters Bight of Biafra through Calabar estuary.

CROSSBILL (*Loxia*), genus of birds belonging to the finch family, living in cone-bearing trees of Europe, Asia, and N. America. The curious bill, in which the mandibles are crossed, is adapted for the extraction of seeds from fir-cones, apples, or other fruits.

CROSSBOW, or **ARBALEST,** weapon mounted on the end of a stock shaped like that of a short musket, and having a groove along the top of its barrel for the reception of the missile ('quarrel'). The bow was stretched by a mechanical contrivance or by hand, till cord rested on a notch or catch from which it was released by pressing a trigger. In use in 12th cent., but much inferior to longbow.

CROSSEN, KROSSEN (52° 3′ N., 15° 3′ E.), town, on Oder, Prussia, Germany; manufactures woolen goods; brisk shipping trade in wine and fruit. Pop. 8,000.

CROSSING, term in arch. for the point wherein the nave and transept meet.

CROTHERS, RACHEL. Graduated from the Illinois State Normal School at Normal, Ill., in 1892. Was the founder and president of the Stage Woman's War Relief. Wrote several plays of which are: *The Coming of Mrs. Patrick*; *Old Lady 31*; *A Man's World*; *Ourselves*; *Mother Carey's Chickens*; *The Three of Us*; *Myself Bettina*; *Young Wisdom*; *The Heart of Paddy-Whack*; *Once Upon a Time*; *39 East*; *A Little Journey*; *Nice People*; *Everyday* and *He and She.* All of the above plays were produced under her own direction.

CROTHERS, SAMUEL MCCHORD (1857), American clergyman and essayist. A. B. Wittenberg College 1873; A.B. Princeton University, 1874; Union Theological Seminary, 1874-7; Harvard Divinity School, 1881-2; (D.D. Harvard, 1899, Litt. D. St. Lawrence, 1904; Princeton, 1909.) Ordained Presbyterian ministry, 1877; entered Unitarian ministry, 1882. Author of *Members of One Body*; *The Understanding Heart*; *The Endless Life*; *By the Christmas Fire*; *Oliver Wendell Holmes and His Fellow Boarders*; *Three Lords of Destiny*; *The Dame School of Experience*, 1919; *How to Know Emerson*, 1920.

CROTON, a river in New York which joins the Hudson, 32 miles north of New York City. Before the construction of the Catskill Aqueduct it supplied the city with water through the Croton Aqueduct, which was first opened in 1842.

CROTON OIL, prepared by grinding the seeds of the euphorbiaceous tree, *Croton Tiglium*, is a viscid, brownish-yellow, acid, malodorous fluid; powerful irritant, used in med. as a violent purgative, and, mixed with Cajiput oil and alcohol, as a blister-raising liniment (*e.g.*), in acute bronchitis.

CROTON WATERSHED, the area from which New York City receives about half of its water supply. The old aqueduct of this name stretched from Croton Lake to the city, a distance of about 30 miles, and was built of masonry, lined with brick, in 1842. It was able to convey about 72,000,000 gallons of water a day, its cross-section area being 53⅓ square feet. In the eighties the need for increasing the city's water supply became imperative, and in 1890 the new Croton Aqueduct was finished. It is an enclosed waterway of masonry, lined with brick and, in places, with steel, with a cross section area of 155½ square feet, or about twelve feet in diameter, capable of conveying 300,000,000 gallons a day. Its total length is 30¾ miles, stretching from the Croton Dam to 135th St., New York, where a gatehouse distributes the flow through

12 lines of 48 inch pipes, four of which enter Central Park Reservoir. The aqueduct lies almost entirely underground, having been blasted out of solid rock, except for a few blowouts, where it rises above ground, where the flow may be diverted in case of emergency. Passing under the Harlem River the diameter of the aqueduct narrows to ten feet, the water being forced through by pressure. In 1906 a new dam was constructed at Croton Lake, to further increase the available water supply.

CROTONA (39° 8′ N., 17° 8′ E.), ancient Gk. town, E. of Lucania, Italy; founded by Achæans, 710 B.C.; residence of philosopher Pythagoras; modern Cotrone.

CROTONIC ACID ($C_4H_6O_2$) crystallizes in needles, M.P. 72°, B.P. *c.* 180°. Isocrotonic acid is an oil (B.P. *c.* 172°), and methacrylic acid crystals (M.P. 16°, B.P. *c.* 160°) are isomeric acids.

CROUP, term formerly applied to conditions in which there is difficulty in breathing, sore throat, hoarseness, and hard coughing, most of such cases being now recognized as of diphtheritic origin. A false membrane, resembling that of diphtheria, may also be found on the throat in scarlet fever, measles, etc., but in such cases the so-called c. is merely a complication of the primary disease. The term is properly now applied only in non-infectious acute laryngitis (inflammation of the throat), in which in severe cases the mucous membrane may be very much swollen, the difficulty in breathing intense, and death may occur. Such cases may go on to the more severe forms, tracheotomy, making an artificial opening into the windpipe, is often necessary.

CROWBERRY, CRAKEBERRY (*Empetrum nigrum*), small heath-like shrub with edible black berries; grows in the colder parts of N. hemisphere and on the S. American Andes.

CROW FAMILY, CORVIDÆ, moderately sized, large, and strong-billed perching birds, often with black, or black and grey plumage. The 330 known species are spread over the whole world. The members of the genus *Corvus* are known by their sharp-edged bill, straight beneath, curved to the tip on the upper profile; such are the large glossy raven (*C. corax*); the sooty, majestic rook (*C. frugilegus*); the carrion crow (*C. corone*); the jackdaw (*C. monedula*); and the hooded crow (*C. cornix*). The long-tailed magpies have a single black-and-white representative (*Pica pica*); the common jay (*Garrulus glandarius*), is easily distinguished by the light-blue bars on its wing feathers.

CROW INDIANS, tribe of N. Amer. Indians inhabiting reservation in Montana; once notorious for raids on whites.

CROWDER, ENOCH HERBERT, (1859), American army officer; *b.* Missouri. He graduated from the U.S. Military Academy in 1881, entered the army and rose through various grades of the service, becoming brigadier general and judge advocate in 1911. He served in the Philippines (1898-1901), in Cuba (1906-08) and during the World War was provost marshal general in charge of the selective draft system. He was awarded the D.S.M. for his war services. In 1919 was sent officially to Cuba and has since been active in adjusting economic conditions on that island, and supervising legislation. On Feb. 9, 1923, he was appointed U. S. Ambassador to Cuba.

CROWE, EYRE EVANS (1799-1868), Eng. historian and journalist; author of valuable *History of France.*

CROWLAND, CROYLAND (52° 42′ N., 0° 11′ W.), market town, on Welland, Lincolnshire, England; a Benedictine abbey was founded by King Ethebald in VIII. cent., and portion remaining is now used as parish church.

CROWN, gold coin of Henry VIII.'s reign; since Charles II.'s days coined only in silver; value, five shillings.

CROWN, head-dress worn as badge of honor. Alexander the Great wore the first royal crown of Greece, but the crown was never a symbol of rule in republican or imperial Rome; as in Greece, victors in athletic contests received wreaths of leaves or flowers, which also rewarded success in war, and were worn on ceremonial occasions; gold later replaced early simple garland. C. has been a symbol of sovereignity since the beginning of Christian times, replacing earlier diadem. Eng. dukes and marquesses were first invested with crowns in XIV. cent. The royal crown of Britain was made in Charles II.'s reign; made of gold and studded with gems, it is surmounted with a Maltese cross, having on each point a pearl. The queen's crown which was specially made for Queen Victoria in 1838; contains the ruby taken by Henry V. at *Agincourt,* the sapphire from Edward the Confessor's ring, and the sapphire from the crown of Charles II. The Scot. crown was recovered from a chest in Edinburgh Castle in 1818.

The coronet, a small crown, is the state head-dress of the nobility; a duke's coronet being a gold circle surmounted by eight strawberry leaves of gold; a marquess's, silver gilt with four gold strawberry leaves; an earl's, silver gilt with eight silver balls on points, with gold strawberry leaves between; a viscount's, silver gilt with sixteen silver balls; while a baron's is silver gilt with six silver balls.

CROWN LAND, estate belonging to head of a country or state.

CROWN POINT, a town in Essex co. in New York, and 36 m. distant from Burlington. It is situated on Lake Champlain, so-called after the French colonizer, Champlain, and the remains of a British fort captured by the Americans in 1775. Iron and ore deposits in the neighborhood.

CROWTHERS, SAMUEL (1880). Attended Friends Select School at Philadelphia and graduated from the University of Pennsylvania in 1901; LL.B., 1904. Went to the Balkan States in 1905 as a newspaper correspondent and in 1918-19 was correspondent for the New York Tribune and System Magazine in England and also Germany. In addition to his contributions to various magazines he wrote *American Rowing,* 1905; *Common Sense and Labor*; *Why Men Strike* and *The Book of Business* in 1920; and *The Life of George W. Perkins*; *Henry Ford* and *The First Million the Hardest* in 1922.

CROYDON (51° 22′ N., 0° 6′ W.), town, Surrey, England; chiefly residential; has handsome parish church and public buildings; formerly seat of abp's of Canterbury; has excellent railway service; chief manufacture, clocks. Pop. 1921, 191,500.

CROZET ISLANDS (46° 27′ S., 52° E.), group of uninhabited islands of volcanic origin, in S. Indian Ocean.

CROZIER, WILLIAM (1855), American military officer; *b.* Carrollton, Ohio. He graduated at the United States Military Academy in 1876, and during the next three years served in several Indian campaigns. He taught mathematics at West Point (1879-1884). He participated in the Spanish-American war; became brigadier general and chief of ordnance in 1901 and in 1912-13 served as president of the Army War College. He was an authority on artillery and wrote many textbooks on that subject.

CRUCIBLE, an open, cup-shaped vessel or melting-pot used for melting and calcining substances which need the application of extreme heat (metals, ores, minerals, glass, etc.). They must be made of some infusible, unbreakable substance, such as clay, graphite, lime, aluminium, platinum, porcelain, or silver. The Hessian C. (of fire-clay and coarse sand) is the commonest kind. For analytical purposes platinum and porcelain are much used. Lime or carbon C's. will withstand the highest temperatures. Also a hollow place at the bottom of a furnace to receive the melted metal. Figuratively, a test of the most decisive kind. A trying out or purifying test.

CRUCIFERÆ, large order of plants, widely distributed in temperate zones, whose flowers have four petals arranged like a Maltese cross and six stamens, two opposite stamens being shorter than the others. Insects generally effect the pollination. About 120 genera with 1,200 species are known, many of them cultivated for food; they include cabbage, radish, mustard, stock, wallflower, and other well-known garden and field plants.

CRUCIFIX (Lat. *cruci fixus,* fastened to the cross), literally 'the Crucified One,' a cross with the effigy of Christ fastened to it. The C. began to replace the plain cross in churches in the reign of Constantine (*d.* 337 A.D.). The Greek Church did not acknowledge them, and they were not commonly used in the East till the close of the 8th century. They were general in the Latin Church in the Carlovigian period. They form a prominent feature in Roman Catholic churches, and in the Lutheran churches. The earliest representations presented Christ as alive and clothed, with open eyes, the figure being pierced by four nails. The symbolic sacrificial lamb often figured on the cross, with a medallion bust of Christ, as in the Vatican cross. Later Christ appears as dead, naked except for a loin-cloth, fastened by three nails. In Catholic churches the principal C. stands in the center of the high-altar. They are generally of gold or silver, but are sometimes made of wood, or stone, and smaller ones of ivory. Many great artists and sculptors have carved C's. Sometimes a pictorial and not a plastic representation appeared on the cross. See Carus, *The Crucifix, Court,* xiii. 1899; Ashton and Baring Gould, *Legendary History of the Cross,* 1887; Stockbauer, *Kunstgeschichte des Kreuzes,* 1820.

CRUDEN (57° 24′ N., 1° 52′ W.), village, on Cruden Bay, Aberdeenshire, Scotland; seaside resort.

CRUDEN, ALEXANDER (1701-70), Scot. scholar; author of *Concordance to the Bible,* pub. 1737, and other works, chiefly religious.

CRUISER. See BATTLESHIP.

CRUELTY TO CHILDREN, SOCIETY FOR THE PREVENTION OF. See Society for the Prevention of Cruelty to Children.

CRUELTY TO ANIMALS, PREVENTION OF, a movement begun in England to protect domestic animals from inhumane treatment. The first society for this purpose was founded in London in 1824 and for a while devoted itself to having proper legislation passed through Parliament with this object. This was accomplished in 1849, when a law was passed fixing a fine of £5 as the penalty for willful ill treatment of an animal. The first American society of this sort was chartered in 1866 in New York City, largely through the initiative of Henry Bergh, who was president of it for 22 years following. Similar societies have since been founded in practically all other states or cities of the Union, where laws similar to those of England have been passed. Usually the punishment is in the form of a fine from $5 to $30, or imprisonment for from 30 to 60 days, or both. These laws usually specify cruelty as 'beating, mutilating, lack of proper food and water, overwork and crowded transportation.' In most cases, as in New York, the local society has authority from the state to enforce the laws and to prosecute offenders. The Pennsylvania Society for the Prevention of Cruelty to Animals is considered as an example of the most modern of these organizations. It devotes itself less to prosecution of offenders, and more to moral suasion, in the form of educational literature on the care of animals, etc. Of this same type is the national organization, the American Humane Education Society, with headquarters in Boston, Mass., which devotes its energy to educational work in favor of animals through the schools, preparing articles for the press. One of its features is the Jack London Club, seeking to create sentiment against performances of trained animals. Its official organ is Our Dumb Animals, issued monthly.

CRUIKSHANK, GEORGE (1792-1878), Eng. artist, caricaturist, and book-illustrator; renowned for his illustrations to Dickens, Ainsworth, Lever, etc.; later works definitely moral in purpose (*e.g.*) *Bank Restriction Note*, which satirized the execution of forgers; and the temperance series, *The Bottle*, *The Drunkard's Children*, and *The Worship of Bacchus*.

CRUSADES, name for series of expeditions (XI.-XIII. cent's) for the purpose of rescuing the Holy Land from 'infidels' and extending the territory of Christianity. The immediate cause was danger to the Byzantine Empire from Seljukian Turks. Persians had conquered Mesopotamia and northern Syria and invaded Asia Minor (603-10), when the usurper Phocas was Byzantine emperor. Under his successor, Palestine was attacked, Jerusalem with the Holy Sepulchre fell into Persian hands, 614, and a Persian force seized Chalcedon, close to Constantinople. The Church took the lead in fitting out an army, and after a long, brilliant war, which was precedent for C., recovered the Holy Land, 628.

A more important precedent was established in the wars of Mohammedanism: the 'Star and Crescent' was the emblem of Holy War before the Cross. The Arabs had attacked the Byzantine and Persian Empires, and captured Jerusalem, 637. The proselytizing zeal of the Arabs, however, soon died away, Christianity on the whole being tolerated and pilgrimages allowed to Holy places. With the rise of the Seljukian Turks not only Christianity but civilization was threatened. The Turks, who had accepted Mohammedanism, established a great Mongol state in Asia under Seljuk, conquered Persia, and attacked the Eastern Empire at the period of its lowest decline. A decisive victory at Manzikert resulted in the capture of Jerusalem from Arabs (1071); Asia Minor was conquered; appeals were made by Emperor Alexius Comnenus to Baldwin of Flanders and Pope Urban II.

Pilgrimages to Jerusalem were naturally regarded as of greater sanctifying benefit than those to ordinary shrines, and were very often made. Under Turk. rule pilgrims were subject to great outrages; and the idea of a Holy War was taken up by Gregory VII., when the Byzantine emperor, Michael VII. begged for aid against the Turk. Envoys of Emperor Alexius appeared at Council of Clermont (1095), and Urgan II. made a speech advocating aid to Eastern Empire as incident to a larger attack on the infidel. The great object was the recovery of Holy places, but C's were partly due to other motives, some of them secular. The Church conceived the idea of turning to pious use the warlike character of feudal society; rulers were glad to direct energies of turbulent nobles into distant channels; great nobles entertained visions of rule in the East. A pestilence was then raging in Europe, and dearth and civil strife made men eager to escape and try possibilities of countries reputed to be rich. Urban's speech was received with great enthusiasm; Peter the Hermit, monk of Amiens, wandered through

France and Italy, preaching a Holy War.

Five contingents of 'paupers' formed the first division, of which only two contingents (under Peter the Hermit and Walter the Penniless) arrived at Constantinople. The whole company fell before the Turks on setting foot in Asia Minor (1097). The second division, that of the magnates, was under the general command of Adhemar, bp. of Puy, and papal legate, whose appointment by the pope marked Church origin of war. Chief leaders were: Godfrey de Bouillon, his bro's Baldwin and Eustace, Hugh de Vermandois, brother of king of France, Stephen, Count of Blois, Robert, Count of Flanders, Raymond, Count of Toulouse, Bohemund, Prince of Otranto, and Tancred, Duke of Apulia; they arrived at Constantinople in 1097; their force, according to tradition, numbered 300,000 men, but probably its strength was only half that number. Alexius carefully took homage of leaders for lands they might conquer from infidels, before allowing the huge army to pass on. The moment was favorable; the population of Asia Minor and Syria, groaning under military occupation of the barbarous Turk, was ready to assist; the Seljukian Empire, extremely decentralized, was a prey to dissensions. Jerusalem changed hands in 1098, and Asia Minor was speedily restored to Byzantine Empire; Antioch was captured and retained by Bohemund, 1098, but disputed by Raymond. Baldwin was made Count of Edessa. Led by Godfrey de Bouillon, the Crusaders, their forces diminished by fever and famine, captured Jerusalem after a month's siege (1099); the papal legate being dead, Godfrey was made ruler as 'advocate of the Holy Sepulchre.' On Godfrey's death (1100) Baldwin was crowned king of Jerusalem, and enmity to Bohemund of Antioch led to support of Latin Kingdom by the Byzantine emperor; other leaders obtained feudal lordships in the midst of the enemies' country, Turks and Arabs not being completely expelled.

Second Crusade (1147-49), Latin Kingdom failed to become permanent; the Franks could not thrive in the climate, morality suffered, Eastern vices were adopted, people were alienated by despotic rule which showed worst evil of feudal system. Edessa was captured by Mohammedans (1144); and Franks appealed to Europe. St. Bernard at request of Eugenius III. preached a C.; Louis VII. of France and Conrad III. of Germany took the Cross, the overlordship of territories gained being reserved to Byzantine emperor. There was disunion from the first; Byzantine emperor could not give aid because of a war with Sicily; the north Ger. force was diverted in a separate C. against the Wends; that of England and Netherlands went to capture Lisbon; Conrad and Louis united in Holy Land with King Baldwin III. in an unsuccessful attack on Damascus and returned. The net result was further weakening of the Latin Kingdom. Damascus conquered by Turks, 1154, and regained, 1174, was taken, 1183, by Saladin, who thus united Mohammedan realms of Egypt and of northern Syria. Jerusalem fell, 1187.

Third Crusade (1189-92). At the news of the capture of the Holy City papal letters were issued and the kings of Germany, France, and England took the Cross; 'Saladin tithe' was imposed on all who did not go, while, on the other hand, Crusaders' debts were wiped out; the finest force ever seen in the Middle Ages consequently assembled. Acre, the key to Jerusalem, already besieged by king of Jerusalem, Guy de Lusignan, was the first object of attack; Frederick Barbarossa died on the way; and the German force was almost entirely destroyed; Richard *Coeur de Lion* turned aside to conquer Cyprus, thus becoming founder of Latin Kingdom of Cyprus, but joined French, 1191, before Acre, which surrendered shortly afterwards. Philip Augustus and Richard quarrelled, and the former returned to France; Richard, unable to take Jerusalem, made a truce with Saladin, 1192, by which Christians retained only the seaboard from Jaffa to Tyre and received permission to visit the Holy Sepulchre. An important feature of this C. is lay initiative and subordinate religious element.

Fourth Crusade (1202-4). Henry VI., emperor of Germany, took the Cross in 1195, but died (1197) before he was ready to start; from his plans, however, his real aim was to attack Byzantine Empire. Innocent III. now took up the work and sought to restore to C's the character of a Holy War lost sight of in territorial schemes; France responded, Theobald of Champagne being chief commander, and Baldwin of Flanders and the Count of Blois being leaders. They decided to attack Egypt, chief seat of Turk. rule, as a preliminary to the recapture of Palestine; Venice lent her fleet, but once the Crusaders were embarked the schemes of Innocent III. went for naught. Persuaded by Philip of Swabia and Venetians the flotilla sailed for Constantinople, capturing Zara for Venice on its way; Constantinople was captured (1204); Baldwin of Flanders was made Byzantine emperor and the territory of Venice enlarged at expense of the Empire. Result of C.

was fatal diversion of Crusaders. Clergy of north of France and Germany, in despair, imagined the scheme of Crusade of Children, hoping that success might be obtained if instruments were pure; thousands of children perished or were sold as slaves (1212).

Fifth Crusade (1218-21), due to enthusiasm of Innocent III. for recapture of Holy places, was preached by him at the fourth Lateran Council, 1215, a Truce of God was proclaimed in the W., and trade with the infidel was forbidden. Emperor Frederic II. took the Cross, but delayed joining; large forces from Germany, however, and from Austria and Hungary, again set forth under leadership of John de Brienne, king of Jerusalem, for Egypt, and captured Damietta, 1219; the papal legate refused to accept terms offered by Sultan, but Crusaders were driven from Egypt, gaining nothing but the surrender of the Holy Cross.

Sixth Crusade (1228-29). C. of territorial expansion based on alliance with infidel and under the interdict of the church; of great interest as remarkable episode in career of Emperor Frederick II., who became titular king of Jerusalem (1225) by marriage with Isabel de Brienne. Frederick, almost certainly a polytheist or freethinker, started on the C. (1227), but, falling sick, returned to Italy, thus incurring papal excommunication, as Gregory IX. would not credit his excuse. Still under the papal ban, Frederick left Italy (1228) and made a treaty (1229) with Sultan by which, in return for toleration of Mohammedanism, he was allowed to proceed to his kingdom of Jerusalem, and Judea was ceded to the Christians. Frederick was obliged to put the crown on his own head as no priest would do so; he was absolved by the pope (1229). Jerusalem, laid waste by Mongolian tribes (1244), was captured by Turks in the same year.

Seventh Crusade. On news of the fall of Jerusalem, a new crusading movement started. Papacy was again at war with Emperor, and at Council of Lyons (1245) Innocent IV. preached a C. against both Frederick II. and infidels. Louis IX. (*St. Louis*) of France supplied the religious element, taking the Cross and winning adherents; Damietta fell at his approach (1249), but, as in Fifth C., further progress was impossible; being captured, he was forced to pay a heavy ransom and to restore Damietta; he went on a pilgrimage to Holy Land, and until 1254 did penance and sought to organize the Christian kingdom. Mohammedans, now weakened by pressure of Tartar tribes and Mameluke mercenaries, became supreme in Egypt, but the Latin Kingdom was torn by dissensions. The Mameluke captain, Bibars, became Sultan (1260), and conquered Jaffa and Antioch (1268).

Eighth Crusade. Remaining towns of Holy Land being threatened by Bibars, Louis IX. again took the Cross (1270), but the crusading movement was dead; only hired soldiers and barons bound by feudal duty followed; an attack on Tunis failed, and Louis died of plague. His companion and heir, Philip the Bold, only secured his retreat by a humiliating truce. Council of Lyons (1274) in vain preached a new C.; Tripoli fell (1289) before the successor of Bibars; Acre surrendered in 1291; Cyprus alone remained under Christian rule. Capture of Rhodes by Hospitallers took place in 1310; an attack in the old crusading spirit was made on Egypt and Syria by Peter I. of Cyprus (1365-69); defensive wars waged by Christians against Turks in XIV. and XV. cent's ended (1453) in capture of Constantinople by Mohammed II.

The importance of the C's in the history of civilization lies in their opening up the East for trade, and the impetus they gave to the study of war. Systematic taxation commenced during C's; France and the papacy, having taken most important part, gained greatly in prestige. History, poetry, languages, and culture of European states were all influenced.

CRUSOE, ROBINSON. See SELKIRK (ALEXANDER), DEFOE (DANIEL).

CRUSTACEA, class of Arthropoda, comprising lobsters, crayfish, prawns, shrimps, crabs, barnacles, water-fleas, wood-lice, sand-hoppers, numerous parasitic and an enormous number of microscopical forms widely distributed in all seas as constituent of the 'plankton.' It is difficult to characterize a group consisting of such diverse members, but they generally have in common a chitinous coat impregnated with carbonate of lime, two-branched appendages, the latter occurring on the abdomen as well as the thorax; and, on the whole, they live in water. Their development is usually indirect, several larval stages being passed through before attaining the adult form. The following are the more important Crustacean orders: *Branchiopoda,* including brine-shrimps and the primitive Apus. *Cladocera,* or water-fleas, chifly freshwater, exhibit an interesting alternation of parthenogenetic and fertilized generations. *Ostracoda,* small, laterally compressed, and with a bivalve shell. *Copepoda* swim about very actively and occur in vast numbers, constituting an important part of the food-supply of fishes. Many are parasitic (*e.g.*), the 'fish-lice.' *Thyrostraca*, or Cirripedia, include barnacles and acorn shells, as well as the degenerate parasitic Sacculina living in the crab. The *Leptostraca* are of theoretical interest, as they probably link the higher Crustaceans with ancient Palæozoic forms. In *Isopoda* the body is flattened from above downwards, and some, the wood-lice or slaters (Oniscus) and pill-bugs (Armadillo), have a respiratory system adapted for terrestrial life. Others are parasitic, and the gribble (Limnoria) eats into wood. Asellus is a common fresh or salt-water isopod. *Amphipoda* have a laterally flattened body, the beach-fleas (Talitrus) and the aquatic Gammarus are common representatives. Phronima, Hyperia, and others are commensals, with other marine animals. The following orders have stalked eyes: *Schizopoda* (*e.g.*), Mysis, Lophogaster, and Euphausia live in the sea, the latter having luminous organs on the eye-stalks. The *Decapoda*, with ten walking legs, comprise the best-known crustacean forms, lobsters, crabs, crayfish, shrimps, and prawns undergoing complete metamorphosis. The *Stomatopoda* are flattened and have a powerful abdomen. The *Cumacea* have unstalked eyes and are marine.

Fossil C. have been discovered from Cambrian strata.

CRUSTUMERIUM, ancient town, Latium, a few miles N.E. of Rome.

CRYOLITE (Na_3AlF_6), mineral occurring in pearly-grey or white masses in granitic veins in Greenland; quarried for production of aluminum and manufacture of enamels and porcelains.

CRYPT, subterranean chamber in ecclesiastical building; originally a chapel attached to the tomb of saint or martyr.

CRYPTOBRANCHUS, genus of tailed lung-breathing Batrachia of the family Amphiumilæ: three known species, *C. maximus* of Japan and Tibet being the largest living Batrachian (about 4 ft. long).

CRYPTOGRAPHY, the art of writing in cipher, or secret characters. Amongst the various methods employed may be mentioned transposition of letters, the use of numerals, misplacement of words, vertical and diagonal reading, etc. The art was used by the ancient Spartans, by the Romans—particularly by Julius Cæsar—and, in later times, was largely employed by Charles I. and the Cavaliers. Francis Bacon exhibited a lively interest in the art, and laid down the dictum that a good cryptogram should be easy to write and read, impossible to detect, and should bear on the face of it nothing to suggest its being a secret message.

CRYPTOMERIA JAPONICA, Jap. cedar, beautiful evergreen tree of China and Japan; attains a height of 100 ft.

CRYPTON. See KRYPTA.

CRYSTAL, body naturally formed by the solidification of a liquid or gas, and bounded by symmetrically arranged plane surfaces, which are the expression of a definite structure. These surfaces meet in constant angles, which are often characteristic of certain substances. Perfect c's are slowly formed from solution (*e.g.*, alum, sugar, common salt), while ice is an example of solidification of a liquid, and hoar-frost and iodine of a vapor. Minerals (*e.g.*, quartz, calcite, etc.), are the best-known examples of crystallization. According to the number and disposition of their axes, (*i.e.*), imaginary lines drawn parallel to certain edges, or from solid angles to the opposite faces, through the center of the c., crystals are grouped in six systems.

CRYSTALLINE BORON. See BORON.

CRYSTALLIZATION, process of forming crystals, usually by cooling out of a substance in state of solution. Fractional c. means the separation of different substances by their successive c.

CRYSTALLOGRAPHY, science of the form, structure, and properties of crystals. Nicolaus Steno was the first to record (1669) that, although the faces of different quartz crystals varied in size and shape, the angles (as measured by a goniometer, the *Contact* form being used for large crystals) between corresponding faces are constant. This fact was corroborated by Bartholinus and Huygens, who agreed with R. Hooke's suggestion that crystals were built up of spheroids. Cappeler, of Lucerne, published the earliest treatise on c's (1723), but the science was not properly founded till 1783-84, when Romé de l'Isle and Hauüy discovered the symmetry of crystals to certain planes, and derived all crystals from six 'primitive forms.' C. S. Weiss (1809) studied crystalline forms from a geometrical standpoint, and introduced a new system of classification. Lévy, Naumann, and Miller (1839) devised methods of notation which refer the planes of crystals to three axes, corresponding in direction to three edges. In 1830 Hesse proved that 32 types of symmetry are possible in crystals, which are now grouped in 32 corresponding classes, belonging to 6 systems. The importance of the optical properties of crystals was recognized by Sir D. Brewster 1828. E.

von Fedorow showed (1912) that when the crystals of any substance are correctly set up and measured on the theodolite goniometer they furnish an adequate means of identification without further analysis. Numerous discoveries in the allied sciences of chem., physics, and mineralogy have done much towards furthering the progress of c.

CRYSTAL PALACE, THE, place of entertainment, Sydenham, London, originally stood in Hyde Park, and is mainly structure erected for Exhibition of 1851; designed by Sir Joseph Paxton.

CRYSTAL GAZING ('Scrying') is the practice of looking into a glass ball or mirror, water, etc., and seeing pictures either of past events or those happening elsewhere. Andrew Lang concluded that neither fraud nor coincidence would account for many of the remarkable results attained, though there has been much superstition mixed up with the subject.

CRYSTALLITE, minute forms of crystallization discovered in 'glassy' volcanic rocks. They may be spherical (globulites), or strung together like beads (margarites), or in groups (globospherites), or like small daggers (longulites), or like hairs (trichites). Microliths are very minute crystallic bodies, usually densely crowded together, often forming fibres or tree-like grouping.

CTENOPHORA, class of Cœlentera, comprising transparent, free-swimming, generally more or less ellipsoidal, often phosphorescent sea-animals, moving with the aid of eight rows of comb-like ciliated plates arranged on meridians, provided with a well-developed jelly-like layer, 'mesoglœa,' a mouth, and ectodermic gullet, and a sense-organ at the pole opposite to the mouth. They are hermaphrodite and undergo direct development. All species except *Beroe* and its relatives are provided with retractile tentacles bearing adhesive cells (*e.g.*), *Cydippe* and the ribbon-shaped Venus' girdle (*Cestus*).

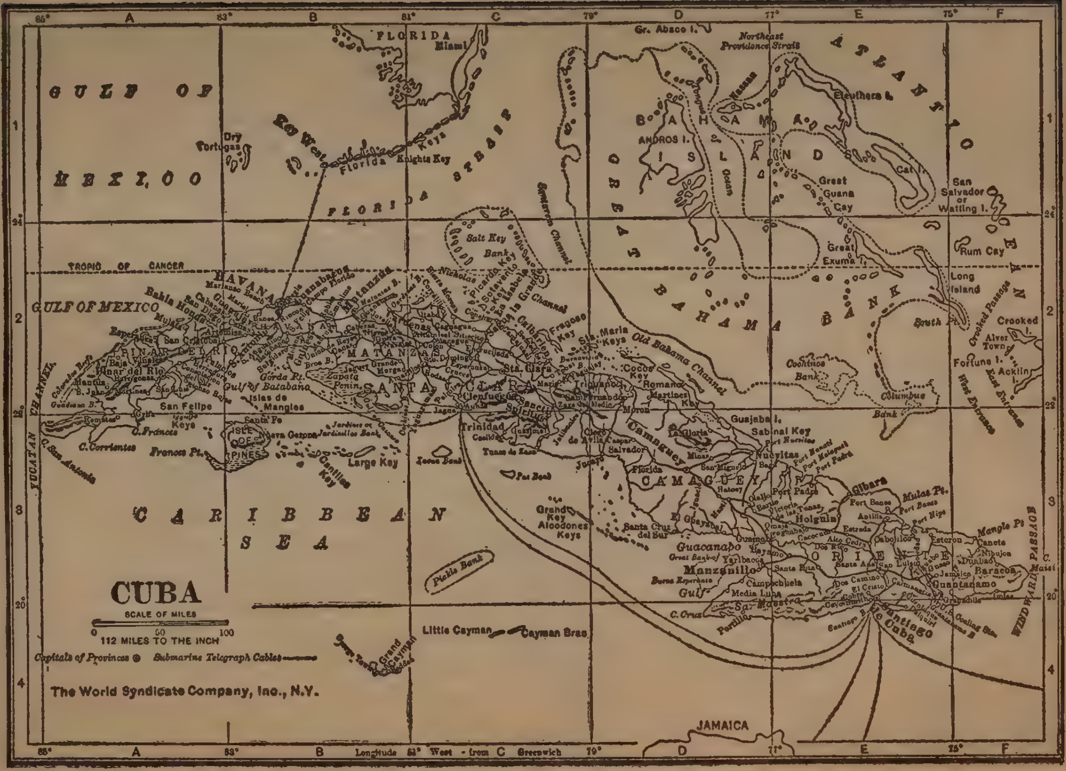
CTESIAS (V. cent.), Gk. historian.

CTESIPHON, anc. city of Assyria (33° 9′, N., 44° 36′ E.), on E. bank of Tigris, about 30 m. below Bagdad, nearly opposite Seleucia; cap. of Parthian Empire (37-32 B.C.); was captured by Emperor Trajan in 116 and by Emperor Septimius Severus (199); scene of defeats of Persians by Emperor Julian (362). The cap. of the Sassanids, it was abandoned by the last of this dynasty to the Arabs in 637, and thereafter the city decayed as the prosperity of Bagdad and Besra increased. During the World War, Ctesiphon marked the limit of Brit. advance in the ill-starred attempt of General Townshend to reach Bagdad (Nov. 1915). The place had been strongly fortified under Ger. supervision, and its heaps of ruins formed excellent shelter for Turk. machine guns. Arrival of Turk. reinforcements forced Townshend to desist from the attempt to capture Ctesiphon, and though he shattered Nured-din's attacks, it was at the cost of practically a third of the Brit. force (about 4,500 casualties, with 800 killed), so that he was obliged to retire pursued by the Turks. The place was found unoccupied by General Maude's victorous troops advancing from Kut to Bagdad (March 1917).

CUBA, republic and largest of W. Indian islands (19° 50′-23° 10′ N., 74° 5′-84° 57′ W.), at entrance to Gulf of Mexico, 130 m. S. of Florida, and separated from Key West by Florida Strait; 730 m. long; breadth, 20-90 m.; coast-line, *c.* 2,000 m., exceedingly dangerous for shipping owing to banks and reefs. There are numerous excellent harbors—notably Havana, the cap., one of finest in W. Indies. In the Sierra de Maestra (prov. Santiago) the Pico del Tarquino rises 8,300 ft. These mts. are densely wooded, and contain copper, iron, and other minerals. The largest river is the Cauto (250 m. long).

The climate of Cuba is more temperate than other W. Indian islands, and healthy in highlands of the interior. During coldest months (Dec. and Jan.) the temp. seldom falls below 50° F., and during July and Aug. 83° is about the maximum. The rainy season lasts from May to Oct. Desolating hurricanes are frequent. The agouti or cavy and insectivores are the only indigenous animals, with the exception of the bat. Birds, including migrants from U.S., are very numerous.

Cuba abounds in luxuriant vegetation, the soil being exceedingly fertile. Long tracts of forests (embracing an area of 1,250,000 ac.) are rich in mahogany, cedar, ebony, etc. A considerable portion of the island is devoted to cattle breeding. About half the center cultivated land consists of sugar plantations, sugar being the most important product. Tobacco, the second largest product, is grown chiefly in the Vuelta Abajo district. The principal cereal is maize; other products are rice, coffee, cotton, cacao, and tropical fruits. There are copper, manganese, and iron mines; gold is found in small quantities; also asphalt, which is not worked much. Only industries are cigar making and sugar milling. Chief trade is with U.S.


CUBA
SCALE OF MILES
0 50 100
112 MILES TO THE INCH
Capitals of Provinces
Submarine Telegraph Cables
The World Syndicate Company, Inc., N.Y.
Longitude 81° West from Greenwich
85° 83° 81° 79° 77° 75°
A B C D E F
1 2 3 4
24° 22° 20°
GULF OF MEXICO
ATLANTIC OCEAN
CARIBBEAN SEA
FLORIDA STRAITS
FLORIDA
Miami
Key West
Florida Keys
Knights Key
Dry Tortugas
TROPIC OF CANCER
GULF OF MEXICO
YUCATAN CHANNEL
C. San Antonio
C. Corrientes
San Felipe Keys
Frances Pt.
ISLE OF PINES
Large Key
Cantiles Key
Jardines et Jardinillos Bank
Islas de Mangles
Gulf of Batabano
Zapata Penin.
HAVANA
Bahia Honda
PINAR DEL RIO
MATANZAS
SANTA CLARA
Cienfuegos
Trinidad
Sancti Spiritus
Sta. Clara
Caibarien
Salt Key Bank
Santaren Channel
Nicholas Channel
Old Bahama Channel
Sta. Maria Keys
Cocos Key
Romano
Guajaba I.
Sabinal Key
Nuevitas
Camaguey
CAMAGUEY
Santa Cruz del Sur
Grand Key
Alcodones Keys
Pickle Bank
Little Cayman
Cayman Brac
Grand Cayman
Guacanabo Gulf
Manzanillo
Holguin
Gibara
ORIENTE
Baracoa
Guantanamo
Santiago de Cuba
Sa. Maestra
C. Cruz
Mulas Pt.
Mangle Pt.
C. Maisi
WINDWARD PASSAGE
JAMAICA
GREAT BAHAMA BANK
BAHAMA ISLANDS
ANDROS I.
Gr. Abaco I.
Northeast Providence Strait
Nassau
Eleuthera I.
Cat I.
Great Guana Cay
Great Exuma I.
San Salvador or Watling I.
Rum Cay
Long Island
Crooked Passage
Crooked I.
Alver Town
Fortune I.
Acklin I.
West Entrance
East Entrance
Columbus Bank
Cochinos Bank

which has coaling stations in the bay of Guantanamo and Bahia Honda. Chief towns are Havana, Santiago, and Matanzas. Two-thirds of inhabitants are whites (mostly of Span. descent). Area, 45,896 sq. m.; pop. 2,150,000.

History. — Cuba (sometimes called 'Queen of the Antilles') is divided into six provinces, and has been an independent republic since 1902. It was discovered by Columbus on his first voyage in 1492, and in 1514 Spaniards settled at Baracoa. The natives were immediately subjected, and, under cruel tyranny, speedily exterminated, and negroes were brought in. In 1519 Havana was founded. In 1846 a hurricane swept away 1,872 houses and sank 216 vessels. Cuba progressed favorably and, being open to the world, carried on a flourishing trade; but wars of independence occurred in 1868-78, and in 1895, owing to continued oppression by the Spaniards; the U.S. intervened, and as a result of the Span.-Amer. War the island was completely freed of Span. sovereignty in 1898, and held by Americans until 1902. In 1906 an insurrection broke out, and a U.S. Commission undertook provisional government till 1909, when a new president assumed office.

There is a house of representatives with 114 members; the national congress has 24 members—4 from each of the states. There is a cabinet, consisting of secretaries of state, of justice, of the interior, of public works, of war and marine; of commerce, agriculture, and labor; of sanitation, of charity, of public instruction, and of finance.

In January, 1923, the American ministry in Cuba was raised to an embassy, and Major General D. H. Crowder was appointed first American Ambassador. See Map Cuba.

CUBE (geom.), regular solid with six equal square sides; (algebra) the third power, the volume of a cube (a^3) being the product of its side (a) taken as a factor thrice.

CUBEBS, dried unripe berry of *Piper cubeba*, a tropical Asiatic (Java) climbing shrub; used in medicine, as a stimulant of mucous membranes, expectorant, and the smoke in respiratory complaints.

CUBIT. See Weights and Measures.

CUBISM. See Post-Impressionism.

CUBITT, SIR WILLIAM (1785-1861), Eng. engineer; invented treadmill; designed Oxford and other canals, the Bute Docks at Cardiff, floating landing-stages at Liverpool, and other works; he was frequently consulted by foreign authorities.

CUBITT, THOMAS (1788-1855), Eng. architect, who planned many of fashionable squares of London and assisted in projection of Battersea Park.

CUCKOO (*Cuculus*), bird of solitary habits, feeding on insects and caterpillars; noted for its characteristic two-syllabled call, and for foisting its parental duties of hatching and feeding the young on other birds, such as the hedge-sparrow, water-wagtail, and titlark. The fact that c's eggs often closely resemble those of their foster-nurses is a peculiar example of natural selection. Other genera of the same family (Cuculidæ) show parasitic habits (*e.g.*), jay c. and American c. The coucal, channelbill, and anis are more divergent types.

CUCKOO-PINT, LORDS AND LADIES, WAKE ROBIN (*Arum maculatum*), plant of order Aroidaceæ; flowers arranged on a spadix and enclosed by a bract or spathe.

CUCKOO - SPIT, frothy secretion found on plants produced by the froth-fly (or frog-hopper), a small insect. Within the secretion is found the larva.

CUCUMBER (*Cucumis astiva*), widely cultivated, edible, annual creeping plant of the order Cucurbitaceæ, smaller varieties being termed *gherkins*. The squirting c., *Ecballium elaterium*, yield the extremely powerful purgative elaterium.

CUCURBITACEÆ, order of tendrilled climbing plants containing about 85 genera and 650 species, with succulent, frequently edible, tough-rinded fruits, growing in temperate and warm climates. The briony, cucumbers, gourx, melon, pumpkin, marrow, and chocho are the more important representatives.

CUDDALORE (11° 42′ N., 79° 48′ E.), town, S. Arcot district, Madras India; exports sugar, oil-seeds, and indigo; scene of several battles between French and British in XVIII. cent. Pop. 52,000.

CUDDAPAH (14° 29′ N., 78° 52′ E.), district, Madras, India; partly hilly, partly low-lying plains; climate unhealthy; watered by Pennar and tributaries; chief town, Cuddapah; cotton and indigo are exported. Area, 8,723 sq. miles. Pop. 1,291,267.

CUDWORTH, RALPH (1617 - 88), Eng. divine and philosopher; the greatest of the Cambridge Platonists. His chief works were *The True Intellectual System of the Universe*, 1678; and *Treatise Concerning Eternal and Immutable Morality*.

CUENCA (2° 48′ S., 78° 51′ W.),

city, Ecuador, S. America; cathedral and univ.; sugar refineries; exports Peruvian bark, hides, cheese. Pop. 30,000.

CUENCA (40° N., 2° 15′ W.), province Central Spain; chiefly mountains and valleys, clothed with pine forests; stock-raising. Area, 6,636 sq. miles. Pop. 268,458. Cuenca, the capital, has a Gothic cathedral, and is birthplace of Molina. Pop. 11,000.

CUESTA, Mexican term for 'scarped ridge of land, when one slope is steep and the other only slightly inclined.

CUEVAS DE VERA (37° 17′ N., 2° W.), town, on Almanzora, Spain; district rich in silver mines. Pop. 20,562.

CUIRASS (O. Fr. *cuiriee*, Ital. *curazza*) piece of armor, originally leather, later any close-fitting protection for body against attack; now applied to piece of mail covering upper part of body composed of breast-plate and back-plate buckled together at sides.

CUJAS, JACQUES, CUJACIUS (1520-90), Fr. jurist, famous for collections of MSS. and his own commentaries.

CULBERSON, CHARLES A. (1855), American Senator; *s.* of David B. and Eugenia Kimball. Graduated from Virginia Military Institute 1874. Studied law at University of Virginia 1876-7. Attorney-General 1890-4. Governor of Texas 1894-8.. U.S. Senator 1899-1923. Chairman Texas delegation to Democratic National Conventions of 1896, 1904 and 1912.

CULBERTSON, HENRY COE (1874). Graduated from the University of Cincinnati, 1895, and from the University of Chicago in 1900. (D.D. Lenox, 1910; LL. D., Missouri Valley, 1914; Litt. D., Carroll, 1919). Was also a student of the Law School at Columbia University. Ordained a minister of the Presbyterian Church in 1902. Was President of the College of Emporia from 1907-17 and President of the Ripon College in Wisconsin from 1918-21. In 1917 was chief of a section of co-operating organizations under the U.S. Food Administration. Lectured for the Y.M.C.A. in France in 1918 and also lectured for the U.S. Committee on Public Information. In 1921 became circuit manager and lecturer for Radcliffe's Chautauqua System.

CULDEES, monastic order established in Ireland and Scotland from VIII. to XIV. cent., when they seem to have been incorporated with the Canons Regular.

CULLEN (57° 41′ N., 2° 49′ W.), seaport, on Moray Firth, Banffshire, Scotland; industries, fisheries, rope-and-sail-making.

CULEBRA (18° 20′ N., 65° 20′ W.), one of Virgin Islands, E. of Porto Rico, and dependency thereof.

CULEBRA CUT. See PANAMA CANAL.

CULLEN, PAUL (1803-78), Irish ecclesiastic; Abp. of Armagh, 1849; of Dublin, 1852; cardinal, 1866; opposed extreme nationalists and sided with Brit. Government against Fenians.

CULLEN, WILLIAM (1710-90), Scot. physician; practiced at Hamilton. Lecturing on chem., bot., and medical subjects at Glasgow Univ.; app. to chair of med., founded for him at Glasgow; subsequently elected prof. of chem. in Edinburgh.

CULLERA (39° 10′ N., 0° 15′ W.), seaport, Valencia, Spain; exports grain, fruits. Pop. 12,000.

CULLINAN (25° 35′ S., 28° 40′ E.), town, Transvaal; named after Sir Thos. Cullinan, the chairman of the company owning the diamond mines there. The famous c. diamond (discovered in 1905) was bought by the Transvaal Government for $750,000, and presented to Edward VII. While being cut in Amsterdam, a flaw was discovered, and the diamond was divided into a number of gems (including two largest brilliants in existence, viz. 516 and 309 carats).

CULLODEN (57° 30′ N., 4° 5′ W.), moor, 6 miles N.E. of Inverness, Scotland; scene of defeat of Prince Charles Edward by Duke of Cumberland, April 16, 1746 (also called *Drummossie Muir*).

CULLOM, SHELBY MOORE (1829-1914), American legislator and executive; *b.* Wayne co., Ky. He studied law and was admitted to the Illinois bar in 1853, practicing at Springfield. He served in the Illinois legislature for four terms and was elected to Congress in 1865, being re-elected for the next two consecutive terms. He nominated Gen. Grant for President in the Republican national convention, 1872. From 1877 till 1883 he was governor of Illinois, and in 1883 was elected to the United States Senate, where he served until 1913. In that body he was an influential figure and was chairman of many important committees.

CULLUM, GEORGE WASHINGTON (1809-1892), American military officer; *b.* New York City. He graduated from the United States Military Academy in 1833, and devoted himself to the engineering arm of the service for the ensuing 28 years. He was chief of staff to the general-in-chief during the greater part of the Civil War, and from 1864 to 1866 was superintendent of West Point Academy. When he was placed on the retired list in 1874, he bore the rank of colonel and brevet major in the regular army. At his death he left $290,000 to the West Point Academy for the erection and furnishing of a memorial hall. He wrote many military memoirs and monographs, as well as several books on engineering and military subjects.

CULP, JULIA (1881), Dutch singer; *b.* Groningen. In early childhood she mastered the violin, achieving celebrity as a child performer. At 14 she began the study of voice culture and made her debut as a singer at Magdeburg, Germany, where she met with instant success. She made tours through the various countries of Europe and augmented her reputation. Her voice is a rich contralto and shows to especial advantage in lieder singing, in which she has no superior. Her success was pronounced when she visited the United States in 1913.

CULTIVATOR. See IMPLEMENTS, AGRICULTURAL.

CULVERIN. See ARTILLERY.

CUMÆ, KYME (40° 50′ N., 15° 5′ E.), earliest Gk. colony in Italy, on W. coast, near Naples; only ruins remain of once flourishing city—Acropolis, Arco Felice (brick arch, 64 ft. high), amphitheatre, etc.; abode of famous Cumæan sibyl (See SIBYLS); probably founded by Chalcidians from Eubœa, *c.* 1050 B.C.; under Rom. rule, *c.* 350 B.C.; destroyed by Neapolitans, 1205; interesting XIX.-cent. excavations

CUMANA (10° 23′ N., 64° 20′ W.), town and port, Gulf of Cariaco, Venezuela; oldest European settlement on S. Amer. continent; almost totally destroyed by earthquake, 1853. Pop. 9,000.

CUMBERLAND, a city of Maryland, in Allegheny co., of which it is the county seat. It is on the Baltimore and Ohio, the Western Maryland and other railroads, and on the Chesapeake and Ohio Canal and the Potomac River. It is an important railroad point and is a trade center for several important coal districts. It is the second city in the State in population and importance. Its public institutions include a cathedral, academy and convent and other religious houses. It has paper mills, glass works, tanneries, steel and iron mills, and railroad repair shops. Pop. 1920, 29,837.

CUMBERLAND (54° 45′ N., 3° W.), most n.-westerly county in England, bordered by Scotland and Solway Firth in N. C. comprises part of the 'Lake District', the largest lakes being Ullswater, Derwentwater, Bassenthwaite, Thirlemere, Buttermere, Wastwater, Ennerdale. Chief mts. are Scaw Fell Pike (3210 ft.), Scaw Fell (3162), Helvellyn (3118), Skiddaw (3062), Bow Fell (2960), Cross Fell (2892). The most important rivers are Eden, Esk, and Derwent. There are numerous small dairies, estates, and farms. Chief towns are Carlisle (great railway center), Cockermouth (birthplace of Wordsworth), Whitehaven, Workington, Maryport (with coal exports), Wigton, Penrith, and Keswick (a tourist resort, with two fine stone circles in neighborhood). Cumbria was annexed to England in 1157; for centuries the scene of Anglo-Scottish warfare and Border raids. Area, 1,520 sq. miles. Pop. 1921, 273,037.

CUMBERLAND, a city of Rhode Island, in Providence co. It is on the New York, New Haven and Hartford and on the Blackstone River. In the vicinity are important granite quarries. Its industries include the manufactures of horse-shoes, cotton, woolen and worsted goods, and women's clothing. The town contains the only Cistercian Trappist monastery in New England. Pop. 1920, 10,077.

CUMBERLAND GAP, a passage through the Cumberland Mountains, on a line between Kentucky and Tennessee and at the western extremity of Virginia. It was of great importance during the Civil War as it was of great strategic value. Several bloody engagements took place here.

CUMBERLAND MOUNTAINS (36° 50′ N., 83° 10′ W.), chain, forming part of Appalachian system; extends N.E. to S.W. through eastern part of Kentucky into Tennessee; highest altitudes about 2,000 ft.; very rocky; fertile valleys; variety of marbles found; numerous caverns.

CUMBERLAND PRESBYTERIAN CHURCH, THE, was founded in the early part of last century in Kentucky as a protest against the autocracy of the Synod of the Presbyterian Church in that state in refusing local congregations to voice in choosing their own ministers. It grew rapidly during its early career and by 1829 had four synods and a general assembly. During the Civil War its integrity of organization suffered severely over the question of slavery, its membership being distributed largely through the border states, where opinion was divided. Shortly after the negro membership established a separate organization, under the name of the Colored Cumberland Presbyterian Church, in 1904 there was an effort to unite with the Presbyterian Church, resulting in another serious setback in growth. In 1921 there were 1,163 white congregations of the denomination, with a total membership of 72,052, with church property to the value of $1,935,072. There were about 750 ministers and as many Sunday Schools, with 35,000 pupils. Four missions are maintained in China, with about 600 converts, and several missions have been established among the Indians. Two educational institutions are maintained; one, Cumberland College, at Leonard, Tex., and Cumberland Presbyterian Theological Seminary, at McKenzie, Tenn. The colored branch of the denomination had, in 1921, 132 congregations, with 13,077 members and church property valued at $230,426.

CUMBERLAND, RICHARD (1631-1718), Eng. divine and philosopher; ed. at St. Paul's and Cambridge; became bp. of Peterborough. In 1672 he pub. his clumsy but important *De legibus naturoe disquisitio philosophica*, which has been more than once translated.

CUMBERLAND, RICHARD (1732-1811), Eng. dramatist and novelist; was a prolific writer for the stage, his plays numbering upwards of fifty. Perhaps the best is a comedy, *The West Indian*, 1771. His *Memoirs* constitute a useful commentary on the times.

CUMBERLAND RIVER (36° 50′ N., 88° W.), rises in Cumberland mountains, E. Kentucky; flows S.W. through Kentucky into Tennessee; re-enters Kentucky and joins Ohio near Smithland; course about 650 miles; navigable for steamboats to Nashville (200 miles).

CUMBERLAND UNIVERSITY, educational institution, located at Lebanon Tenn., and opened to students in 1842. The buildings were burned during Civil War, but in 1866 the college was reopened, though, without buildings or apparatus. These have since been supplied, and the institution is in a thriving condition. Grounds and buildings represent a value of a quarter of a million dollars and the endowment fund totals about $100,000. In 1923 it had a teaching staff of 24 and an enrollment of 500 students.

CUMBERLAND, WILLIAM AUGUSTUS, DUKE OF (1721-65), 3rd *s.* of George II.; Duke of C., 1726; distinguished general; won great fame at Fontenoy, 1745; put down the Jacobite rebellion, 1745-46, winning the battle of Culloden.

CUMBRAES, THE (55° 45′ N., 4° 55′ W.), two islands, Firth of Clyde, Scotland, between Isle of Bute and Ayrshire; form part of county of Bute. Great Cumbrae has circumference of 10½ miles; only town, Millport, summer resort. Little Cumbrae has area about one square mile; lighthouse.

CUMIN, CUMMIN (*Cuminum cyminum*), annual herbaceous umbelliferous plant of Mediterranean countries and Asia; seed used for curry powder and therapeutically as carminative.

CUMMINS, ALBERT BAIRD (1850), American Senator. College education at Waynesburg, Pa. Asst. Chief Engineer of Cincinnati, Richmond and Fort Wayne R. R. Admitted to Illinois Bar 1875. Removed to Des Moines 1878. Member of Iowa House of Representatives 1888. Governor of Iowa 1902-08. Elected U.S. Senator Nov. 24, 1908 for unexpired term of Senator Allison, deceased. Re-elected for terms 1909-15, 1915-21 and 1921-1927. Was President pro tempore of the United States Senate.

CUMNOCK (55° 28′ N., 4° 16′ W.), town, Ayrshire, Scotland; coal mines in New Cumnock parish.

CUMYN. See Comyn.

CUNARD, SIR SAMUEL, Bart. (1787-1865), Anglo-Canadian engineer and shipowner; founder of Cunard Steamship Line.

CUNAS, tribe of Panama Indians.

CUNDINAMARCA (*c.* 5° N., 72° W.), department, E. central Colombia, S. America; consists chiefly of plateaux; productive soil; coffee, tobacco, cereals. Area, 8,046 sq. miles. Pop. 720,000.

CUNEIFORM WRITING, the name given to the system of writing found on Babylonian, Assyrian and Persian monuments and elsewhere writing was used by the people of these nations. The characters were wedge shaped and are sometimes described as arrow-headed or nail-headed. They seem to have been originally in the nature of hieroglyphs and are believed to have been invented by the inhabitants of ancient Caldea in Mesopotamia, called Akkadians. They were used by the Babylonians and Assyrians who conquered these peoples, with some modifications. The inscriptions were chiseled upon stone and iron, but in the common writing of documents and writing, they were impressed upon soft clay with a pointed stylus of pen which had three unequal facets or sides, the smallest to make the fine wedges of the cuneiform signs, the middle to make the thicker wedges, and the large to make the outer and thick wedges in the characters. The earliest date that can be found for the use of this form of writing is about 3800 B.C. The use was continued until after the birth of Christ. In ruins found in ancient Persepolis, in Persia, these mysterious signs were first discovered and for a long time no one believed that they had any special meaning. A Spanish official who visited Persepolis in 1618 first conceived the idea that these signs might be inscriptions of some kind of lost writings. Other travelers turned their attention to these inscriptions, and after many years they were deciphered. The great German scholar, Neibuhr, established three distinct cuneiform alphabets instead of one. The final discovery of their meaning, however, was due to the researches of another German named Grotefend, who in 1802 worked out the meaning of the cuneiform alphabet. One of the greatest investigators of this first alphabet was Rawlinson, the great English explorer, who copied and read the great Behistun inscriptions made by Darius, King of Persia; on the rocks at Behistun. This inscription contained more than 100 lines and contained an account of the victories of Darius. When the alphabet had finally been perfected, it was possible to read Persia, Babylonian and other inscriptions almost as freely as English, and thousands of documents have been gathered and translated. These have thrown great light on the civilization of these ancient peoples and has reconstructed their history and customs. The cuneiform signs were originally pictures of objects which were first drawn in outline on some vegetable substance. Early in the history of Babylonia, however, clay was adopted as the substance on which to write. This clay hardened easily and was practically indestructible. This style of writing lasted until it was superseded by the Aramic form of the Phoenician alphabet.

CUNEO (44° 23 ′N., 7° 32 ′ E.), town (and province), Italy; formerly fortified; silk and cotton manufacturers. Pop. 27,000.

CUNNINGHAM, ALLAN (1784–1842) Scot. lyric poet and man of letters. Several of his sons were also of a literary turn of mind.

CUNO, CARL (1877), a German statesman who in 1922 succeeded Walter Rathenau as the actual leader in German politics, and who became Chancellor in December, 1922, upon the downfall of the Wirth ministry. He received a careful business training and succeeded Albert Ballin as head of the Hamburg-American Steamship Line. He several times visited the United States and in 1922 perfected an agreement between the Hamburg-American Line and the so-called Harriman interests. Dr. Cuno took a definite attitude toward the French occupation of the Ruhr. He resigned in Aug. 1923. See RUHR.

CUPAR, CUPAR FIFE (56° 19′ N., 3° 1′ W.), town, on Eden, Fife, Scotland; contains several fine public buildings; Bell-Baxter school now occupies site of castle of Macduffs, Earls of Fife; agricultural center; flax-spinning, breweries; native place of Sir David Lyndsay of the Mount. Pop. 4,380.

CUPID (classical myth.), Latin name for Eros, the Gk. god of love; in sculpture and painting a nude boy, blind, winged, and carrying bow and quiver. The beautiful story of the love of C. and Psyche is an allegory of the soul's progress to perfection.

CUPOLA, in arch., dome-shaped portion of roof; shallow domed cover for guns, used in fortification.

CUPPING, method formerly employed in surgery to draw blood to relieve a congestion or an inflammation. In dry c. a round glass vessel is heated and immediately applied to the skin, causing the serum to accumulate under it owing to the partial vacuum created. In wet c. small incisions are first made for blood-letting.

CUPRA, name of two ancient Ital. cities in Picenum. (1) Cupra Maritima (*c.* 43° N., 13° 50′ E.), on Adriatic coast; 48 miles S.S.E. of Ancona. (2) Cupra Montana (*c.* 42° 58′ N., 13° 50′ E.), inland town, 10 miles S.W. of mod. Jesi; mentioned by Pliny and Ptolemy.

CUPRITE (Cu_2O), copper ore, occurring as reddish granular masses or crystals of cubic system, is produced in nature from copper sulphides; found in Cornwall, Arizona, and Urals.

CUPULIFERÆ, botanical group of trees with simple leaves and hard bracts forming cupules. Oak, beech, chestnuts are typical representatives.

CURA, CIUDAD DE CURA (10° N., 67° 38′ W.), town, Aragua, Venezuela; commercial center. Pop. *c.* 13,000.

CURAÇAO, CURAÇOA (12° 10′ N., 69° W.), island, Dutch West Indies, in Caribbean Sea; settled by Spaniards, 1527; taken by Dutch, 1634; chief town, Willemstad, on Bay of St. Anna; salt. Area, 210 sq. miles. Pop. 30,930.

CURAÇAO, liquor manufactured, chiefly in Holland, from peel of Curacoa orange.

CURASSOW (*Cracinoe*), large gallinaceous game-birds of S. American forests, one species (*Crax globicera*) in Central America. Females possess white crest and markings.

CURATE (Fr. *cure*), priest having the care or 'cure' of souls; now applied, in Anglican Church, to an assistant clergyman.

CURD. See CHEESE.

CURES (*c.* 42° 13′ N., 12° 40′ E.), ancient Sabine town, Italy; birthplace of Tatius and Numa.

CURETES (Gk. *kouretes*). (1) Priests of Zeus and Rhea in Gk. myth. (2) A tribe which figures in Homer's *Iliad*, and is said by Strabo to have been located in Greece.

CURFEW ('Cover fire'), custom in Middle Ages of tolling a bell at sunset in summer, and 8 p.m. in winter, as a signal for people to extinguish lights and fires.

CURIA, name of the thirty parts into which, according to tradition, Romulus divided Rom. people, there being ten *curioe* in each of three tribes, ten *gentes* in each curia; members called *curiales*.

CURIA REGIS, name for a Crown Court of Appeal under the Norman kings of England. Ultimately it divided into three courts: Exchequer, Common Pleas, and King's Bench.

CURIA ROMANA, designation of legal and administrative department of papal court (*Corte domana*), the other branches of which are the civil court (familia) and court for ecclesiastical ceremonies (*capella*). Decrees emanating from its various subdivisions are known as Acts of Holy See in distinction from Pontifical Acts; its authority, however emanates from pope who ratifies its acts. It was organized by Sixtus X., 1587; reorganized by Pius X., 1908. Divisions are (1) Tribunals, (2) Offices, (3) Congregations.

(1) There are three Tribunals: the Penitentiary, which deals with matters of conscience; the Rota, court of ultimate appeal in civil and judicial matters; and Signatura, court of cassation. (2) Offices are reduced to Chancery, which issues papal bulls; Datary, which bestows benefices, dispensations, and other 'graces'; the Camera apostolica, which administers property of See; the Palatine secretaries, including secretariate of state; which administers home and foreign affairs and issues papal briefs, secretary of briefs to princes, and secretary of Latin letters. (3) The Congregations are in personal subdivisions of Consistory, and of greatest importance. They are: Congregation of Inquisition, which deals with heresy; of the Consistory, which prepares agenda for Consistory; decides on competence of other congregations, erection of dioceses, etc.; of Papal Visitation, of Sacraments, of disciplinary matters, of Council of Trent, of Propaganda, of Index (list of forbidden books), of Liturgy, of Ceremonies, of Indulgences and Relics, of Fabric of St. Peter's, of Loretto, of Educations, and of Extraordinary Ecclesiastical Business.

CURICO (34° 37′ S., 71° 23′ W.), province, Chile, S. of Colchagua (area, *c.* 3,000 sq. miles); fertile; rich minerals, Pop. 1910, 108,120. Capital, Curico. Pop. 18,000.

CURIE, MARIE SKLODOWSKA (1868), a Polish-French scientist, *b.* in Warsaw. Graduating from the gymnasium, or high school, in 1884, she specialized in physics, and in 1891 went to Paris to continue her studies. It was there that she first met her future husband, Pierre Curie, with whom she did such remarkable team work. He was then professor in a school in Sevres where she studied after coming to France. It was in 1898 that they announced their discovery of a new and strongly radioactive substance in pitchblende, from which later developed their discovery of radium. M. Curie died in 1906, and Madame Curie continued their investigations alone. In 1908 she was appointed chief professor of physics in the University of Paris, an unusual honor for a woman. In 1911 she was awarded the Nobel Prize for Chemistry, although in 1903 she and her husband had been awarded the Nobel Prize for Physics. In 1921 Madam Curie visited the United States and was accorded honors shown only to great personages. She arrived in New York on May 11 and returned home on June 25, and during this period she received at the hands of President Harding a gram of radium, valued at $100,000, together with mesathorium valued at $22,000, placed in a costly mahogany box from the Madam Curie Radium Fund Committee, which had raised by popular subscriptions the funds necessary for the purchase of these costly elements, so that she might be able to continue her investigations. She also received honorary degrees from Yale, Columbia, Chicago, Northwestern, Wellesley, Pennsylvania, Smith and the Women's Medical universities or colleges. From the American Philosophical Society she received a medal which carried with it a money award of $800; the Naples Table Award, of $2,000, and several similar honors.

CURIE, PIERRE (1859-1906), Fr. physicist; prof. of physics at Sorbonne; he married Marie Sklodowska (1867), with whom he jointly discovered polonium and radium. In 1903 they received Davy medal of Royal Soc., and shared the Nobel prize for physics with Henri Becquerel. Madame Curie succeeded her husband as director of physics at the Faculty of Sciences in Paris, and in 1911 received the Nobel prize for chemistry.

CURIO, GAIUS SCRIBONIUS (*d.* 53 B.C.), Rom. statesman and general of age of Cicero; consul, 76 B.C.; oratory better than his statesmanship. His clever son of same name erected first Rom. amphitheater.

CURITYBA, CURITIBA (25° 30′ S., 49° 30′ W.), town, Paraná, Brazil; several factories; exports maté. Pop. 50,000.

CURLEW, WHAUP (*Numenius arquatus*), long-billed bird of the family Scolopacidæ, living on the northern moors and heaths in summer and seashores in winter, known by its peculiar cry. About twenty species are known.

CURLING, game played on the ice by throwing rounded stones along the surface to a mark; probably of Dutch origin, but has been popular in Scotland at least from the beginning of the XVII. cent., and has spread to England, Canada, Switzerland, and other countries.

CURLING, THOMAS BLIGARD (1811-88), Eng. surgeon; pres. Royal Coll. of Surgeons (1873); introduced new surgical treatments and wrote several surgical works.

CURRAGH (53° 8′ N., 6° 50′ W.), plain, County Kildare, Ireland; famous for its race course and military camp; crown property.

CURRAN, JOHN PHILPOT (1750-1817), Irish lawyer and politician; worked for Catholic emancipation and against Union; became Master of the Rolls, 1806.

CURRANTS, dried, seedless berries of a dwarf variety of grape-vine cultivated in the Levant, chiefly in Greece. Garden currants of the white, red, and black variety are fruits of deciduous shrubs of the genus *Ribes*.

CURRENCY (MONEY), that which is current or in circulation, as a medium of trade. The word is generally applied to coins and what is termed paper money, comprising bills issued by authority, and to bank-notes or notes issued by government. In the science of political economy it more properly connotes money in the sense of coin, bills of exchange, notes, or other paper substitutes, being no more than a means of economizing the amount of coin or bullion in any country. Money in this more restricted sense may be defined as the means by which two persons who do not deal together mutually as producers and consumers are enabled to enter into transactions. It is therefore only a means to an end, but is essential to the subdivision of labor and services and the very organization of a civilized society. Some common measure of value must necessarily be adopted as an essential part of the machinery of trade, or, in the language of economists, for the purpose of facilitating exchanges. Various substances have been used in different countries to serve as money, (*e.g.*), the Chinese formerly used cubes of tea and ancient classic nations used cattle. But as the precious metals, gold and silver, and in a lesser degree copper, have been for long the universal substances selected for the purpose by reason of the possession of their qualities of intrinsic value, durability, susceptibility to division, and portability, it is unnecessary to consider any other kinds. Besides acting as a medium of exchange, money performs the no less essential functions of serving as the measure of the value of all other substances and as a means for effecting credit. In the vast majority of transactions no money, in the strict sense, is used to liquidate debts on either side. But the same result is obtained by negotiation of bills of exchange and notes through the intermediation of banks. These paper instruments are therefore a substitute for money. In most modern countries that form of promissory note known as a bank-note is part of the ordinary C. Notes are made legal tender provided they are issued by the state or by a state bank. When once in circulation such notes discharge debts as completely as current coin, in spite of fluctuations in value; an illustration of such C. is afforded by the American 'green-backs,' which have in the past fluctuated in value by as much as 80 per cent., or more. Promissory notes issued by bankers may of course be refused as payment of a debt, and can only be circulated with the entire concurrence of those who receive them. Where notes are not convertible into money on demand, they are what is called 'inconvertible C.' The danger of inconvertible paper C. is that there is no real limit to the issue, with the result that there may be a poor prospect of redeeming the notes, and such huge sums may therefore by their means be added to the C. as to exercise a pre-judicial influence on the financial resources of a country and ultimately to injure the credit of a government.

Advocates of a double standard insist upon the relative value of gold and silver being fixed by international agreement; but the fallacies underlying this proposal, which is commonly known as bi-metallism, may be refuted by consideration of the effect of the cost of production of the precious metals. See BIMETALLISM.

The problem of stabilizing the currency in the countries of Continental Europe was one of the most serious obstacles in the way of reconstruction in the year following the World War. In Russia, Austria, and, to a large extent, in Germany, gold and silver currency disappeared from 1918 to 1923.

UNITED STATES CURRENCY.—Prior to the issue of coins by the government, sacks of flour, gold dust, tobacco, and wampum skins were used for money. This C. proving cumbrous, a private coinage was introduced which, although not legal tender, readily passed from hand to hand. Nearly all the states prior to the Federal Constitution increased the limited coinage issuing from Maryland and other of the more advanced states by the issue of paper money. An attempt to provide a sound and uniform C. was made by the establishment of a U.S. Bank in 1791, which was given up in 1811, and of a second in 1816, which was closed in 1832 owing to President Jackson's opposition. The bi-metallic standard (the 'dollar,' without decision as to whether it was to be of gold or silver, having been made the unit) caused speculation in gold and silver coin, and in 1834 the ratio of coinage was changed from 15.1 to 16.1. Between 1837 and 1844 several state banks collapsed and Federal credit was so impaired that payment for land was ordered to be made in specie. Some of the states repudiated their public debts. Radical experiments ensued. An independent U.S. Treasury was established in 1846, and also a sub-Treasury. Treasury notes were made receivable for public debts, and selected cities were named as centers of deposit for government funds. In 1861 a panic occurred, specie payments being suspended, and in 1862 Secretary Chase issued legal-tender notes, founded on specie support (greenbacks), though owing to the rise of prices and depreciation of notes, specie payment of notes was later suspended. In 1863 the National Bank system was established, a national C. was provided for, secured by U.S. bonds, the banks being allowed to issue C. up to 90 per cent. of government bonds deposited. In 1869 occurred the worst panic in the history of U.S.A., President Grant declaring government bonds should be redeemed in gold, not C. In 1870-71 Refunding Acts provided that the bonds be paid in 'coin' and exempt from tax. In 1873, after serious results of speculation in gold, the gold standard was tentatively asserted, but between 1876 and 1890 the Bland Bill, providing for the free coinage of silver dollars, loosed a flood of over 300 millions of silver dollars on the country which banks refused to accept, as they also did the silver dollar certificates issued in 1886. To relieve the pressure of silver the Secretary of the Treasury was empowered to purchase them and store them, issuing Treasury notes against them. In 1893, the fall in the value of silver was accelerated by the establishment of the gold standard in India, and after a period of depression a serious political agitation led by W. J. Bryan arose for the re-establishment of a bi-metallic standard. In 1900 the Currency Act was passed, definitely making gold the standard, and creating more favorable conditions for national banks. The 1907 panic was followed in 1908 by the Aldrich Currency Bill, allowing banks to issue C. on security of other than government bonds. The Owen-Glass Bill in 1913 (the Federal Reserve Act) established Federal Reserve Banks in twelve cities to afford means of rediscounting commercial paper and establishing a more effective supervision of banking. By this law the government is empowered to issue notes to the value of three times the value of the 'lawful money' held by these banks—on a 5 per cent. gold reserve. See BANKS, UNITED STATES BANKS, FEDERAL RESERVE COINAGE, AMERICAN.

CURRENCY CONFERENCES, international assemblies for establishing uniform *media* of exchange. First met in Paris, 1867, at time of Exhibition.

CURRENTS, MARINE. See MARINE CURRENTS.

CURRIE, SIR ARTHUR WILLIAM (1875), Canadian soldier. He was *b.* in England and after receiving preliminary education entered the army. Following a period of military training in England, he went to Canada and was promoted through the various grades in the army until he became inspector-general. In the World War he commanded the Canadian Corps in France with great distinction. He received many honors and was several times mentioned in despatches. He was awarded the French Cross of the Legion of Honor. In 1920 he became principal of McGill University.

CURRIE, BARTON WOOD (1878). Studied at Harvard from 1895-6 and at the New York Law School from 1897-8. Served in the Spanish American War as a chief yeoman in the United States Navy. Was a reporter on leading newspapers in New York City from 1900-12 during which time he made a trip to Labrador as a representative of the New York World to meet Admiral Perry on his return from his last polar expedition. In 1912 he became associate editor and in 1917 editor of the Country Gentleman which position he resigned in 1920 to become editor of The Ladies Home Journal. Wrote numerous short stories and was the author of *Officer 666*, 1912; and *The Tractor* in 1916.

CURRIE, SIR DONALD (1825-1909), Scot. shipowner; established 'Castle' Line, 1862, between Liverpool and Calcutta; Castle Line of South Africa was amalgamated with Union Line as 'Union Castle.'

CURRIE, JAMES (1756-1805), Scot. physician; promoted hydrotherapy and prepared a standard edition of Burns.

CURRY. (1) Method of dressing leather; (2) to rub down a horse; (3) a pungent Indian condiment of powdered chillies, coriander, etc.; (4) also a dish of meat, fish, or vegetables, etc., in which c. is an ingredient; served with rice.

CURSOR, LUCIOUS PARIPIUS (fl. 325 B.C.), Rom. dictator.

CURSOR, MUNDI, Eng. XIII.-cent. religious dialectal poem, dealing with history of the world.

CURTANA, Edward the Confessor's pointless 'Sword of Mercy,' used in Eng. coronations.

CURTEA DE ARGES (45° 40′ N., 24° 40′ E.), town, on Arges, Rumania; one of ancient capitals of Walachia; bp.'s see; cathedral (built XVI. cent.) is finest specimen of Byzantine arch. in Rumania. Pop. 4,210.

CURTIN, ANDREW GREGG (1815-1894), American diplomat and executive; *b.* Bellefonte, Pa. He studied law at Dickinson College and began practice in 1839. He became Secretary of the Commonwealth of Pennsylvania in 1854 and was elected governor in 1860 and again in 1863. He was one of the so-called 'war governors,' and during the conflict was a tower of strength to the Union cause. He was made Minister to Russia in 1869. In 1873 he shifted his political allegiance to the Democratic party and was a member of Congress as a Democrat from 1881 to 1887.

CURTIN, JEREMIAH (1838-1906), American linguist and archaeologist; *b.* Milwaukee, Wis. He graduated at Harvard in 1863, even at that time having distinguished himself by his facility in acquiring foreign languages. Entering the diplomatic service a year later, he was for six years secretary of legation at St. Petersburg. The knowledge he there acquired of Russian and kindred languages made possible his translations of the works of Tolstoy and Sienkiewicz. He was connected from 1873 to 1881 with the Smithsonian institution, and later delved deeply into the ethnology of the North American Indians. Apart from his translations, his works include *Myths and Folk-Tales of the Russians, Western Slavs and Magyars*, 1894; *Hero Tales of Ireland*, 1894; *The Mongols*, 1907; *A Journey in Southern Russia*, 1909; *Myths of the Medocs*, 1912; the three latter works being posthumous publications.

CURTIS, CHARLES (1860), American Senator. Common school education. Admitted to Bar 1881. Member 53-60th Congress 1893-1909 from Kansas. Elected U.S. Senator Jan. 23, 1907 for unexpired term of J. R. Burton, resigned. Resigned seat in 60th Congress, re-elected for terms 1907-13, 1915-21, 1921-1927.

CURTIS, CYRUS HERMANN KROTZSCHMAR (1850), American publisher; *b.* Portland, Maine. He received a public school education, removed to Philadelphia in 1876 and entered the publishing business, establishing the Tribune and Farmer. Later he founded the Ladies' Home Journal, which had a phenomenal success, paralleled later by that of the Saturday Evening Post, published by the company of which he is the head. The Country Gentleman is another periodical of the Curtis Publishing Co., which also has the controlling interest in the Philadelphia Public Ledger.

CURTIS, GEORGE TICKNOR (1812-1894), American lawyer and author; *b.* Watertown, Mass. He entered the legal profession and settled in New York City, where his ability secured for him a large practice and a high reputation. His publications include *American Conveyancer*; *Life of Daniel Webster*; *Life of James Buchanan*; *Creation or Evolution* and *John Charaxes*, a novel.

CURTIS, GEORGE WILLIAM (1824-92), Amer. author; ed. *Harper's Monthly* and *Harper's Weekly*; wrote several books of travel and some verse.

CURTIS, WILLIAM ELEROY (1850-1911), American journalist; *b.* Akron, Ohio. He graduated at Western Reserve University in 1871, and from 1873 to 1887 was on the staff of the Chicago Inter-Ocean, where he became widely known for his work in interviewing the James Brothers and his investigations of the Ku Klux Klan. From 1887 to 1901 he was Washington correspondent of the Chicago Record, later being associated with the Record-Herald. He served as chief of the Latin-American department and historical section of the Columbian Exposition (1891-93). His publications include *Capitals of Spanish America*, 1888; *Yankees of the East*, 1896; *Between the Andes and the Ocean*, 1900; *The Turk and his Lost Provinces*, 1902; and *Modern India*, 1905.

CURTISS, GLENN HAMMOND (1878), American aviator and manufacturer; *b.* Hammondsport, N. Y. His bent lay in the direction of mechanics, and when only 18 years old he established a world's record for the fastest mile ever made on a motorcycle. He was director of the Aerial Experiment Association of America from 1907 to 1909. He won many prizes as an aviator, notably the $10,000 prize offered by the New York World for the fastest flight from Albany to New York in 1910. He has made numerous flights in America and abroad and has rendered services to aviation only second to those of the Wright Bros. He has engaged extensively in the manufacture of airplanes, being president of the Curtiss Aeroplane Co. In 1922 he made a successful demonstration of a motorless glider. He has received a medal from the Smithsonian Institution.

CURTIUS, ERNST (1814-96), Ger. historian; *b.* Lübeck, prof. at Berlin Univ.; made excavations in Greece for Ger. Government; wrote numerous archæological works and standard *History of Greece.*

CURTIUS, MARCUS, Rom. legendary hero. A chasm having opened in the Forum, the soothsayers declared that it could only be filled by throwing into it Rome's best treasure; C., crying that the greatest treasure of Rome was courage, leaped on horseback into the chasm, which immediately closed up.

CURTIUS RUFUS, QUINTUS (date uncertain), Latin author; wrote *Life of Alexander the Great.*

CURULE CHAIR, Rom. chair of state, said to have been used in very early times as an emblem of kingly power.

CURVE.—May be defined as a continuous, singly-infinite system of points. A c. may be regarded as being generated by the motion of a point, which occupies in succession all the different points of the line. We may regard any c. as being defined by a relation or relations existing between the co-ordinates of the moving point (*i.e.*), we represent c's by means of equations. Hence we have a means of classifying c's according to the degree of the equations which represent them. This method was due originally to Descartes. Different systems of co-ordinates (as Cartesian, Polar, Trilinear, etc.), may be employed giving corresponding equations.

CURVILINEAR, term in arch. for a kind of decorative tracery.

CURWOOD, JAMES OLIVER (1878), American author; *b.* Owosso, Mich. He studied at the University of Michigan and entered upon newspaper work, becoming editor of the Detroit News-Tribune. His true vocation however, was that of a novelist and he resigned his editorship in 1907 to devote himself exclusively to story-writing. Most of his novels are based on the American and Canadian Northwest, which he knows perhaps better than any living writer. His many works include *The Wolf Hunters*, 1908; *The Gold Hunters*, 1909; *Philip Steele of the Royal Mounted*, 1911; *Flower of the North*, 1912; *Kazan*, 1914; *The Hunted Woman*, 1916; *The Courage of Marge O'Doone*, 1918; *The River's End*, 1919; *The Valley of Silent Men*, 1920; and *The Country Beyond*, 1922. Several of his stories have formed the basis of motion picture dramas.

CURZOLA (42° 55′ N., 16° 55′ E.), island, Adriatic Sea, belonging to Dalmatia, Austria; ancient *Corcyra*; capital, *Curzola*, on E. coast; fortified; has XII.-cent. cathedral; boat-building; fishing. Pop. 17,377.

CUSA, NICHOLAS OF (1401-64), Ger. ecclesiastic; *s.* of fisherman; took name from birthplace; maintained superiority of Councils over popes at Council of Basel, but changed his views; made cardinal, 1448; interesting as speculative philosopher and scientist, anticipating neo-Platonism and Copernican theory.

CUSH, *s.* of the Biblical Ham, after whom is named the land of Cush, in Upper Egypt.

CUSHING, CALEB (1800-79), Amer. statesman, jurist, and diplomatist; originally Jeffersonian Republican, but became Whig; did great service in Southern War, codifying laws, etc., but mistrusted by party.

CUSHING, FRANK HAMILTON (1857-1900), American ethnologist; *b.*

Northeast, Pa. He was only 19 when he was appointed curator of the ethnological exhibit at the Centennial Exposition. He headed archæological expeditions to Arizona in 1881 and to Florida in 1895. He became connected with the United States Bureau of Ethnology in 1897. He was an authority on the Zuni Indians, among whom he lived for a considerable time. His publications include *My Adventures in Zuni*, 1883; *Manual Concepts*, 1892; *Zuni Breadstuff*, 1885; and *Report on the Ancient Key Dwellers of Florida*, 1896.

CUSHING, WILLIAM M. BARKER, (1842-74), Amer. naval commander. He won great distinction in Civil War for gallant service. His most brilliant and daring exploit was the blowing up of the Confederate ironclad Albermarle, while at anchor at Plymouth, North Carolina, in 1864.

CURZON OF KEDLESTON, GEO. NATHANIEL, 1ST MARQUIS (1859), Brit. (Conservative) statesman; under-secretary for India, (1891-2); under-secretary for foreign affairs (1895-98); viceroy of India (1899-1905), during which time occurred the Tibet expedition (1904), unrest in Bengal (*Swadeshi* movement and partition of Bengal); opposition of Kitchener (1905) on question of dual control of Ind. army led to his resignation (1906); chancellor of Oxford Univ. (1907); cr. earl (1911); leader of House of Lords since 1916; president of Air Board and member of Imperial War Cabinet (1916); foreign secretary from Oct. 1919. He took a prominent part in the conference between the European powers and Turkey at Lausanne in 1922-23, and participated in other international conferences during those years. Traveled extensively in Central Asia, Persia, Afghanistan, the Pamirs, etc.; author of *Russia in Central Asia*, 1889; *Persia and the Persian Question*, 1892; *Problems of the Far East*, 1894; *Principles and Methods of University Reform*, 1909; *Modern Parliamentary Eloquence*, 1913; *War Poems*, 1915; *Subjects of the Day*, 1915.

CUSHMAN, CHARLOTTE SAUNDERS (1816-76), Amer. Shakespearean actress.

CUSP, in arch., point where tracery intersects.

CUSTARD APPLES, edible fruit of different species of *Anona*, shrubs and trees of tropical America and India.

CUSTER, GEORGE ARMSTRONG (1839-76), Amer. general; distinguished himself in war with Confederate States; led campaigns against Indians, in last of which he and his party, including his bro., Lieut.-Col. Thomas Ward C., were massacred.

CUSTINE, ADAM PHILIPPE, COMTE DE (1740-93), Fr. general; condemned as traitor and guillotined; see remarkable memoirs of his dau.-in-law.

CUSTOMARY FREEHOLD, in law, a kind of copyhold tenure.

CUSTOMS. See TARIFF.

CUSTOS, ROTULORUM, leading county justice of peace, and keeper of the records.

CUSTOZZA (45° 22′ N., 10° 47′ W.), village, Verona, Italy; scene of Austrian victories over Piedmontese, 1848, over Italians, 1866.

CÜSTRIN, KÜSTRIN (52° 35′ N., 14° 37′ E.), fortified town, Brandenburg, Prussia, at confluence of Warthe and Oder; has considerable river trade: manufactures machinery, pianos, furniture, etc. Pop. 17,400.

CUTCH, GULF OF (23° N., 70° E.), arm of Indian Ocean, between peninsula of Cutch and Kathiawar.

CUTCH, KACH (22° 47′ to 24° 40′ N., 68° 26′ to 71° 45′ E.), principality between Gujarat and Sind, forming a kind of peninsula, on W. coast of Brit. India; area, 7,616 sq. miles: frequent earthquakes; governed by native chief under Brit. protection. N. and E. lies the *Runn of Cutch*, which is flooded half the year, and converts C. into an island. When not flooded, the Runn is mostly a desert with a deposit of salt. Pop. 515,000.

CUTHBERT, ST. (*d.* 687), Scot. Evangelist; *b.* S.E. Scotland; joined Melrose Abbey, becoming prior; later prior of Lindisfarne, bp. of Hexham, and bp. of Lindisfarne; preferred hermit life; converted Scotland, from Forth to Tweed, to Christianity; biography by Bede; famed during life and after death for sanctity, asceticism, and evangelizing power.

CUTLASS, CUTLAS, COURTELAS, sailors' sword with curved blade; used with cutting, not thrusting, movement.

CUTLERY, general term originally applied to edged or cutting instruments. Modern c., while including forks, does not include certain cutting-tools (*e.g.*), carpenter's tools—chissels, saws, etc. Surgical instruments and gardening implements (sickles, pruning-hooks, etc.) come under the term; domestic c. includes table-knives, forks, razors, scissors, pocket-knives, etc. In manufacture of knives, etc., the order is—forging, empering, grinding, polishing, fitting, inishing. Cheap knives are made by machinery. A razor is made from a steel bar the thickness of its back; t is shaped roughly by hammer; ground, empered, ground again, and finished by lapping and polishing. Scissor blades are made from flat steel bars. Forks are formed by dies; cheap forks are cast.

CUTTACK, KATAK (20° 29′ N., 86° E.), city, Bihar and Orissa, India, 220 miles S.W. of Calcutta; seat of Ravenshaw Coll., and famous for gold and silver filigree work; capital of Cuttack—a district in Orissa bounded on E. by Bay of Bengal, and embracing delta of Mahanuddy. There is a canal to False Point. Pop. 55,000.

CUTTING, MARY STEWART DOUBLEDAY (1851), American author; b. New York City. Her first verses were published in Lippincott's Magazine but her main force lies in story-writing, to which she has chiefly devoted herself. Her publications include *Heart of Lynn*, 1904; *Little Stories of Courtship*, 1905; *The Suburban Whirl*, 1907; *Just For Two*, 1909; *The Lovers of Sanna*, 1912; *Refractory Husband*, 1913; *The Blossoming Rod*, 1914; and *Some of Us Are Married*, 1920.

CUTTING, ROBERT FULTON (1852), American banker, welfare worker and political reformer; *b.* New York City. He graduated from Columbia University in 1871. Besides being connected with large financial interests, he has devoted much time to social and political problems. In 1892 he became president of the Association for Improving the Condition of the Poor and seven years later of the New York Trade School Association. He has been a prominent figure in the Citizens' Union. In 1912 he published *The Church and Society*.

CUTTLEBONE. See CEPHALOPODA.

CUTTLEFISH. See CEPHALOPODA.

CUTTS OF GOWRAN, JOHN, BARON (1661-1707), Eng. writer, general, and diplomatist; distinguished in Irish wars, 1690-91, at siege of Namur, and under Marlborough; subject of Swift's *Ode to a Salamander*.

CUVIER, GEORGES LÉOPOLD CHRÉTIEN FRÉDÉRIC DAGOBERT (1769-1832), Fr. anatomist; assistant, later prof. in the Jardin des Plantes, Paris; made painstaking researches in comparative anatomy and palæontology especially of molluscs and vertebrates and fossil reptiles and mammals. His numerous research papers were embodied in his classical work, *Le regne animal* (1817; 2nd, 1830).

CUVILLES, FRANÇOIS DE (fl. 1740), Fr. engraver and architect.

CUXHAVEN, KUXHAVEN (53° 52′ N., 8° 41′ E.), fortified town, at mouth of Elbe, Hamburg State, Germany; fine harbor; free port; sea-fishing. Pop. 15,000.

CUYABA, CUIABA (15° 30′ S., 55° 38′ W.), town, Brazil; formerly center of rich goldfields. Pop. 36,000.

CUYAPO (15° 50′ N., 120° 43′ E.), town, Luzon, Philippine Islands; rice. Pop. 17,000.

CUYLER, THEODORE LEDYARD (1822-1909), American clergyman and author; *b.* Aurora, N. Y. He graduated from Princeton College in 1841 and from the Princeton Theological Seminary five years later. From 1860 to 1880 he was pastor of the Lafayette Avenue Presbyterian Church in Brooklyn, N. Y., achieving there international fame as a preacher. He was a most prolific writer, and besides more than 3,000 articles in magazines, his works include *Cedar Christian*, 1863; *The Empty Crib*, 1868; *Heart Life*, 1871; *From the Nile to Norway*, 1881; *Stirring the Eagle's Nest*, 1890; and *Our Christmas Tides*, 1904. He resigned his pastorate in 1890 to devote himself to literary work.

CUYP, ALBERT (1620-91), Dutch artist; famous for landscapes. His *f.* Jacob Gerritz (1575-1649), was also noted as an artist.

CUZA, ALEXANDER JOHN (1820-73), prince of Rumania; abdicated.

CUZCO.—(1) (13° 30′ S., 72° 4′ W.), city, Peru, in valley of Andes; founded by Manco Capac, XI. cent.; ancient capital of the Incas; site of famous Temple of the Sun, now occupied by Dominican convent; remains of gigantic fortress and other Inca arch.; taken by Pizarro, 1533; bp.'s see; cathedral, univ.; chief manufacture, cotton and woolen goods. Pop. 30,000. (2) department, Peru; area, 155,950 sq. miles. Pop. 330,000.

CYANIC ACID ($CNOH$), volatile acid liquid, polymerizing above 0° to two solids, cyanuric acid, $C_3N_3O_3H_3$, and cyamelide ($CNOH$).

CYANIDE, a metallic salt of hydrocyanic (prussic) acid. Potassium cyanide is used in extracting gold.

CYANITE (Al_2SiO_5), sky-blue mineral occurring as long flat crystals in gneiss and mica schists.

CYANOGEN (C_2N_2), colorless, poisonous gas, burning with a purple flame. M.P. -34.4°; B.P. -25°. C. acts like a radicle (*i. e.*) like an element in forming compounds.

CYANOSIS. See RESPIRATORY SYSTEM.

CYAXARES, king of Media in late VII. and early VI. cent's B.C.; conquered Scythians and Assyrians, destroying Nineveh, 606; founded Median empire.

CYBELE (classical myth.), Phrygian goddess of fruitfulness, and mother of the gods; in Gk. *Rhea.*

CYCLADES (37° N., 25° E.), group of islands in Ægean Sea; of volcanic origin; generally mountainous; mostly fertile; among principal are Andros, Paros, Delos (*q.v.*), Melos (*q.v.*), Tinos, Myconos, Naxos, Thera, Ceos; form separate nome of kingdom of Greece; export emery. Area, 1,042 sq. miles. Pop. 130,370.

CYCLAMEN, genus of primulaceous plants of Central and S. Europe.

CYCLING, the use of a bicycle as a means of locomotion. This pastime has undergone many changes since the early days of the 19th cent., when the 'dandy-horse,' a two-wheeled structure propelled by pushing the ground with each foot in turn, afforded pleasure to the young men of the period. Pedals fixed to cranks connected with the back wheel were introduced about 1840. In 1868 the pedals were arranged to turn the front wheel. Later improvements have been steel wire tension spokes (1870); ball bearings (1877); Dunlop's pneumatic tires (1888); 'free-wheel' (1901), rim-brake, changeable gear. The cycle is extensively used by the military, and during the World War dispatch riders used the motorcycle.

CYCLOID, curve traced by a point on the periphery of circle rolling in a plane along a line. When the tracing point is within the circle the resulting curve is termed a prolate, when without, a curtate c. Both the latter curves are known as trochoids.

CYCLOMETER, a device for recording the distance traveled on bicycles, motorcycles, automobiles and other wheeled vehicles. A purely automatic apparatus connected with the wheels registers the number of revolutions and records the results in the form of miles or fractions thereof on a paper roll inside the car. It is used extensively by railroads, where to its main function it adds that of locating and determining inequalities in the roadbed.

CYCLONE, an eddy or circling current of air formed by the meeting of a polar current of cold air with an equatorial current of warm air. At the center of th eddy the barometer is lowest. The di rection of the wind is from places wher the atmosphere pressure is high t places where it is low, but the center o the c. is comparatively calm, the ful force of the wind being felt where th barometric differences are most marked The term Anti-Cyclone is applied to th belt of high pressure surrounding th cyclonic area. As the lowest baromet rical readings indicate the center of th c., so the highest readings mark th locality of the anti-c. Hurricanes typhoons, and tropical storms ar typical forms of c.

CYCLOPEAN MASONRY, name given to the rude wall-building of th ancient Greeks and Etruscans, in whic huge blocks of unshaped rock were used

CYCLOPES, or **CYCLOPS** (classica myth.), race of giants in which two set are mentioned. Homer's c. are a wil race led by their one-eyed chief, Polyphemus. The C. of the older traditio are three Titans each with one eye i the center of his forehead; these thre forged Jove's thunderbolts.

CYCLOSTYLE, term used in arch. i reference to building consisting o columns arranged in circular form.

CYGNUS, 'Swan' constellation of N hemisphere between Pegasus and Lyra

CYLINDER, surface traced by straight line rotating round a paralle straight line as axis; also the spac contained between such a surface an two parallel planes either perpendicula (right c.) or oblique (oblique c.) to th axis.

CYLLENE (37° 56′ N., 22° 24′ E.) mountain, Greece, N.E. of Arcadia sacred to Hermes; modern Ziria.

CYMA, term in arch. for double curved moulding.

CYMBALS, musical instruments dating from pre-historic times. The moder c's consist of thin circular metal plate (tin and copper alloy), which ar clashed, or rubbed, together.

CYNEGILS (*d.* 643), king of Wessex Christianized.

CYNEWULF (*d.* 785), king of Wessex

CYNEWULF (fl. 750), Old Eng. poet nothing known of life; four poems *Christ, Juliana, Helene,* and *The Fate of the Apostles,* proved to be his by insertion of his name in Runic letters i text; poetry shows feeling for nature especially in stormy moods.

CYNICS, THE, a Gk. philosophica

chool founded by Antisthenes (b. *c.* 436 B.C.), an acquaintance of Socrates. Diogenes of Sinope (reported to have lived in a tub) is its best-known member. They held that virtue is the only good, vice the only evil, everything else indifferent or even contemptible. Hence they wished to discard all the gains of civilization. and preached a 'return to nature,' which was often exaggerated into a dirty shamelessness.

CYNOSURE (Lat. *cynosura*), ancient name for the 'Little Bear' constellation, hence anything which draws the attention.

CYPERACEÆ, widely distributed order of grass or rush-like herbs, comprising about 70 genera with 3,000 species; many are marsh plants. Papyrus, bulrushes, sedges, and cotton-grass are common representatives.

CYPRESS (*Cupressus*), germs of aromatic, dark, evergreen, cone-bearing trees, comprising 15 species of S. Europe, W. Asia, Himalayas, China, Japan, America and Mexico. *C. sempervirens* is the characteristic tree of Mediterranean countries, and its wood was prized by the ancients for durability. The tree receives its name from Cyparissus, a youth who grieved so much for a stag that the gods changed him into a c. tree; hence the association of the c. with death and mourning.

CYPRIAN, ST. (*c.* 200-58), bp. of Carthage; converted from paganism to Christianity; made bp. 248-49; after various conflicts between Christians and the State, C. was beheaded by order of the Emperor Valerian; one of most remarkable Fathers of the Church, and writer of treatises important for patristic history.

CYPRUS, third largest isl. in Mediterranean (35° N., 33′ E.); 60 m. W. of Syria, 44 m. S. of Asia Minor; length, 140 m., including the Karpas Peninsula; breadth, 30 to 60 m.; area, 3,584 sq. m. In N. are two ranges of mts., and one in S., with Mt. Troödos (6,406 ft.). In the center is a low-lying fertile plain. Rivers are generally dry beds; torrents after heavy rains (Nov.-May) and snow melting. Irrigation is effected by wells and a canal. Climate is good, except in hot seasons, when fever is prevalent in low-lying regions. The Cyprus sheep (moufflon) has become exceedingly scarce. Cyprus was famed of old for copper (from which its name is derived), but supplies seem exhausted. Salt is mined and procured by evaporation. Most important products are wheat, barley, locust beans, cotton, silk, flax, tobacco, wool, gypsum, fruits, sponges, and large quantities of wine. Splendid mules are bred. Under Brit. administration the isl. has greatly improved, materially and otherwise. The principal towns are Nicosia (cap.), Laranaca, Limasol, Famagusta. There is a railway from Famagusta to Evrychou (76 m.). The inhabitants mostly belong to the Gr. Church, but there are many Mohammedans. Pop. 274,100.

History.—Cyprus is Chittim of O. T.; colonized by Phœnicians *c.* 1000 B. C.; held in turn by Egyptians, Assyrians, Persians, Greeks, and returned to Egypt till 57 B. C., when it became a Roman prov. Then came Saracens and Byzantines. Taken by Richard Cœur de Lion, 1191, the isl. was sold to Guy de Lusignan; acquired by the Venetians, 1479; captured by Turks, 1571; nominally a Turkish possession, although under Brit. administration from 1878 till Turkey entered World War; annexed by Britain, Nov. 5, 1914. The high commissioner is assisted by executive and legislative councils. Cyprus is famed for its antiquarian treasures, chiefly brought to light since General di Cesnola began excavations, 1866. It was an important British naval station during the World War. See MAP EUROPE.

CYPRUS, CHURCH OF, independent but orthodox-Gk. church, its status being confirmed by general councils and the Byzantine Empire.

CYPSELUS (657-627 B. C.), tyrant of Corinth; famous builder and patron of art.

CYR, ST. See ST. CYR.

CYRANO DE BERGERAC, SAVINIEN (1620-55), Fr. soldier, novelist, and dramatist; wrote plays on classical model, and scientific-romantic stories; notorious for reckless bravery, duels, and free-thinking; subject of play by Rostand.

CYRENAICA (*c.* 31° N., 21° E.), district on N. African coast; boundaries ill-defined, but modern C. is considered larger than ancient C. Northern half in ancient history was called Pentapolis, having five considerable towns: Barca and Cyrene, inland; Hesperis (later Berenice), Apollonia, Teucheira (later Arsinoë), on coast. After some 500 years' prosperity, C. declined about 100 B. C.; interesting ruins. As result of Turco-Italian War, 1911-12, C. or Bengazi passed to Italy along with Tripoli. Area, 30,000 sq. miles. Pop. 250,000.

CYRENAICS, THE, a Gk. philosophical school founded by Aristippus of Cyrene (*c.* 435-360 B. C.), an acquaintance of Socrates. They held that the only good is the pleasure of the moment, and all else valuable only insofar as it produces pleasure. Aristippus himself, though thoroughly a 'man of the world,' valued wisdom and culture as liberating a man from external circumstances; his followers often fell either into licentiousness or into disillusioned pessimism.

CYRENE (32° 46′ N., 21° 53′ E.), original capital of ancient district of Cyrenaica, N. Africa; situated on crest of Jebel Akhdar, about 10 miles inland; now in complete ruins; built about middle of VII. cent. B. C., and said to have been called after a local nymph; became a great city and passed to Rome in 96 B. C.; mostly ruined before Christian era, and became deserted till Arab conquest, 641 A. D.; said to have once had a population of over 100,000.

CYRIL (315-86), bp. of Jerusalem; famed for addresses to catechumens.

CYRIL (*c.* 376-444), bp. of Alexandria. As patriarch of Alexandria expelled Jews, and in zeal against heretics is said to have instigated murder of Hypatia; defeated Nestorius at Council of Ephesus, 431; works valuable in patristic literature.

CYRIL (827-69), Gk. missionary to Slavs; supposed inventor of 'Cyrillic' alphabet. His bro., Methodius, shared his life work.

CYRILLUS (V. cent.), Gk. jurist.

CYRTO-STYLE, term in arch. for a columned circular portico.

CYRUS, name of two great Persian rulers. Cyrus the Great: modern dispute as to his origin; succ. to throne of Anzan, *c.* 558 B. C.; overthrew his suzerain Astyages, king of the Medes, 550, and became sole ruler of Medes and Persians; defeated Crœsus of Lydia, and annexed Lydia, 546; overran Asia Minor; captured Babylon and annexed its dominions, 539; slain in warfare with savage tribes of eastern frontier, 528. Cyrus the Younger, younger *s.* of Darius II. of Persia; in Peloponnesian War gave important help to Spartans, who assisted him in attempt to overturn government of bro., Artaxerxes, and obtained insight into military weakness of Persia; slain at *Cunaxa*, 401.

CYSTOLITH, concretion of calcium carbonate in cellulose matrix of some plant cells, as in the leaves of the india-rubber plant.

CYTHERA (36° 15′ N., 23° E.), one of Ionian Islands, S. of Laconia, Greece; modern Cerigo; in ancient times had magnificent temple of Aphrodite; surface mostly rocky; capital, Capsali; wine, corn.

CYTISINE ($C_{11}H_{14}N_2O$), alkaloid occurring in seeds of laburnum and furze.

CYTOLOGY, the branch of biology which deals with the structure, function and life history of cells; the study of cells as component parts of norma tissues is termed histology. See CELL

CYZICUS (40° 25′ N., 27° 50′ E.) ancient Gk. town, on peninsula of Mysia Sea of Marmora, Asia Minor; besieged by Mithridates, 75 B. C.; ruined by earthquake, A. D. 1063.

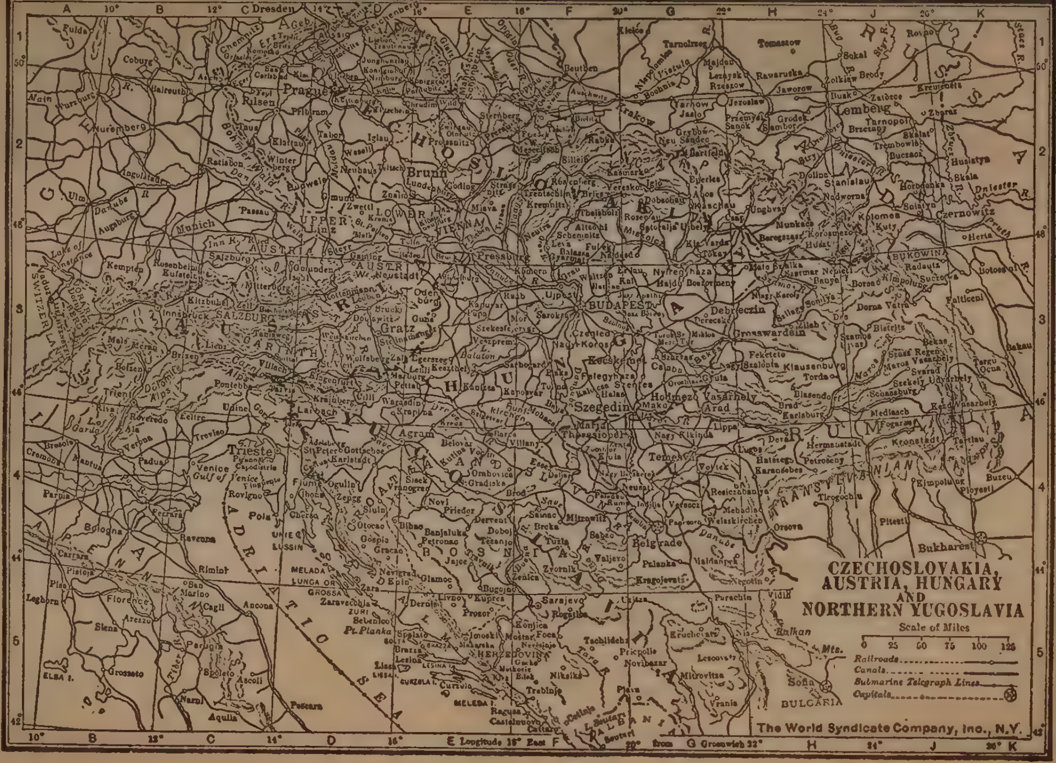
CZAR. See TSAR.

CZARTORYSKI, ADAM GEORG PRINCE (1770-1861), Polish statesman

CZARTPRYSKI, FRYDERYK MICHAL, PRINCE (1696-1775), Polish statesman; formed alliance with Russia Austria, and England against Prussia and France, and left great name as patriot and reformer.

CZECHO-SLOVAKIA, inland republic, Central Europe (48° 10′-51° N., 12° 6′-23° 20′ E.); comprises Bohemia, Moravia, Silesia, and Slovakia natural frontiers are Bohemian Forest in S. W., Erz Mts. in N. W., Giant Mts., Sudetes Mts., and Carpathians in N., Matra Mts. and riv. Danube in S.; surface mountainous with fertile valleys drained by Elbe and tribs., and March climate generally continental; industries include agriculture, mining (especially coal), lumbering, brewing, and distilling, sugar-refining, calicoes, woolens, chemicals, porcelain, glass; chief crops, wheat potatoes, sugar beet, hops; cap. Prague Czechs inhabit Bohemia, Moravia, and Silesia, Slovaks occupy Slovakia; ethnographically comprise one people, speaking one language—branch of Slav race, islanded, in Central Europe. Area, *c.* 60,000 sq. m.; pop. *c.* 13,000,000 (Czechs, *c.* 7,000,000; Slovaks, 3,000,000; Germans, 2,500,000). See MAP CZECHO-SLOVAKIA.

History.—When the Turks invaded Central Europe, 1529, Czechs and Slovaks united with Germans under Habsburgs to resist them; later they rose in revolt against Germans, but were suppressed by Ferdinand II., and battle of White Mt., 1620, marks end of Bohemian independence and beginning of three centuries of oppression. World War gave Czecho-Slovaks opportunity of recovering their freedom; they declined to swear allegience to Austria, and, in spite of persecution, raised forces to help the Allies; recognized as Allied nation by British, Aug. 19, 1918; independence declared, Oct. 18, and recognized, Nov. 14, 1918. During World War nearly 400,000 Czecho-Slovaks deserted


CZECHOSLOVAKIA, AUSTRIA, HUNGARY AND NORTHERN YUGOSLAVIA
Scale of Miles
0 25 50 75 100 125
Railroads
Canals
Submarine Telegraph Lines
Capitals
The World Syndicate Company, Inc., N.Y.
E Longitude 18° East F 20° from G Greenwich 22°
Prague
VIENNA
BUDAPEST
Belgrade
Bukharest
Sofia
BULGARIA
Trieste
Venice
Gulf of Venice
ADRIATIC SEA
Pressburg
Brunn
Gratz
Agram
Szegedin
Debreczin
Lemberg
Krakow
Czernowitz
Sarajevo
Munich
Nuremberg
Linz
Salzburg
Innsbruck
BUKOWINA
HERZEGOVINA
BOSNIA
TRANSYLVANIA
SWITZERLAND
Florence
Bologna
Ancona
Danube
Dniester R.
Balkan Mts.

to Russian and Serbian armies; remainder could not be relied on by Central Powers; former emigrants formed armies abroad; those in Russia, ignored by Bolshevists, moved to Siberia, where Allies later sent them help; in 1919 Czechs and Rumanians advanced unsuccessfully against Bolshevists of Budapest, and later invaded Slovakia; settlement reached after telegram of Peace Council, June 14, and armed forces were withdrawn each to its own territory. By the Treaty of Peace, signed Sept. 10, 1919, Austria recognized Czecho-Slovakia, and agreed that its boundaries should be delimited by a joint field-commission.

Economic and political conditions in Czecho-Slovakia were much more favorable in the years directly following the World War, than in any other of the newly created countries of central Europe. This was due to conservative administration of finance, which prevented such inflation of currency as had caused financial distress in the other countries. Czecho-Slovakia was the first state in Europe to reduce its customs tariff. Decreases of 25 to 50 per cent were made in 1922. Efforts to bring about an autonomy in Slovakia failed, but the Slovaks were assured that they would have every privilege of self government in their local affairs.

CZECHS, Slavic people, to number of 8,000,000, living in Bohemia (Czechy) and parts of Moravia, Silesia, and Hungary, who employ a written language different from that in general use in Bohemia.

CZERNOWITZ, cap. of Bukovina, Rumania, on Pruth (48° 17′ N., 25° 57′ E.); seat of Gr. archbishop; active trade in agricultural produce; changed hands six times during World War, being taken by Russians, 1914, who finally evacuated it in Aug. 1917.

CZERNY, KARL (1791-1857), Austrian composer and pianist; pupil of Beethoven, teacher of Liszt.

CZENSTOCHOWA, CHENSTOKHOV (50° 49′ N., 19° 3′ E.), town, on Wartha, Russ. Poland; place of pilgrimage; cotton and woolen goods. Pop. 69,900.

CZOLGOLZ, LEON (1873-1901), American anarchist and assassin; *b.* Detroit, Mich. His ancestry was German-Polish. He worked desultorily, associated with anarchists and imbibed their doctrines. At the Pan-American Exposition in Buffalo, Sept. 6, 1901, he shot President McKinley, approaching him with a revolver concealed in a handkerchief while the latter was holding a public reception. The President died eight days later and the murderer was sentenced to death on Sept. 26, 1901, expiating his crime in Auburn Prison, N.Y.

D

D, 4th letter of alphabet; Semitic *daleth* meant 'a door,' as did the Gk. derivative *delta*; *d* may be voiceless, (*e.g.*) *rapped*, assimilated (*e.g.*) *gospel*—God's spell, *accept*—ad ceptum.

DABNEY, CHARLES WILLIAM (1855), American College president. Born at Hampden Sydney, Va., *s.* of R. L. Dabney. Graduated from Hampden College in 1873 and University of Virginia in 1877. Also studied in Germany. Was professor of chemistry in University of North Carolina, and State Chemist, an executive officer of the Cotton Centennial Exposition at New Orleans 1884-1885, and Assistant Secretary of Agriculture 1893-97. He was President of the University of Tennessee 1887-1904, and President of the University of Cincinnati from 1904. Published works: *History of Agricultural Education in America*, 1899; *Agriculture and Education*, *The Problem in the South*, 1903; *Fighting for a New World*, 1919. He retired in 1920.

DABO, LEON (1868), American artist, *b.* at Detroit, Michigan. He studied at the Paris art schools and under Daniel Vierge of that city, and Galliardi of Rome. His pictures are in the galleries of the Luxembourg, Paris, the Metropolitan, New York, the Imperial Museum Tokyo, and at Brooklyn, Ottawa, Washington, Detroit, Chicago, etc. He is the Art Director of the Arbuckle Institute, Brooklyn. Mural paintings by him were made for St. John the Baptist Church, Brooklyn, and for Flower Memorial Library, Watertown, New York, etc. He was commissioned a 1st lieutenant of the A.E.F. during the war. Captain in 1918. In 1919 he was one of the corps of interpreters attached to the 27th Division and aide to General Hersey.

DACCA (23° 45′ N., 90° 23′ E.), town, Bengal, India, on Burigunga River; Government headquarters for part of year (July-Sept.); capital of Eastern Bengal and Assam, 1905-12; formerly celebrated for magnificence; seat of projected teaching univ.; has a coll. and ruins of many Mohammedan public buildings; manufactures cotton cloth, gold and silver work, shell-work, and pottery; a jute-trade center. Pop. 1921, 119,450. Dacca Division has area of 15,937 sq. miles. Pop. *c.* 13,000,000. Dacca District, area, 2,782 sq. miles. Pop. *c.* 3,000,000.

DACE, DARE or **DART** (*Leuciscus vulgaris*), European cyprinoid fish living in clear, still streams. In N. America, the name is applied to Minnilus, Semotilus, and other fishes of the same family.

DACHSHUND, 'badger dog', introduced middle of 19th cent. from Germany, resembles basset-hound and old Eng. turnspit; good water dog; courageous and very affectionate.

DACIA (46° N., 24° E.), ancient land of the Daci; district of Central Europe including E. part of Hungary Proper, Transylvania, and Rumania; bounded by Carpathians and Danube. Inhabitants were Thracians; fairly civilized when first known by Romans, who conquered them after long struggle, *c.* 100 B.C.

DACITE, volcanic rocks, allied to andesite, consisting of quartz, plagioclase, feldspar, hornblende, biotite, and pyroxene; found chiefly in Hungary, Scotland, Greece, and N. America.

DACOIT, member of armed gang of Ind. robbers.

DÆDALUS (classical myth.), constructor for Minos of the Cretan labyrinth; made wings for himself and his *s.*, Icarus.

DAFFODIL (*Narcissus pseudo-narcissus*), bulbous plant of the order Amaryllidaceæ; numerous varieties cultivated as garden flowers.

DA GAMA, VASCO (*c.* 1460-1524), Portug. navigator; *b.* Sines in Alem-Tejo; first to reach India by Cape route, 1498; founded Portug. colonies on E. African coast; second voyage to Calicut, 1502; app. Viceroy of India, 1524, but *d.* soon after; celebrated in Camoens' *Lusiads*; gave Portugal vast power and riches, and opened door to East.

DAGGER, a short, pointed, and edged weapon for stabbing; formerly part of civil costume of persons with right to bear arms; still worn in East.

DAGGETT, AARON SIMON (1837), brigadier-general, U. S. A., *b.* at Green Corner, Me., *s.* of Aaron and Dorcas C. Dearborn Daggett. He was educated at Monmouth Academy, Me., Wesleyan Seminary and at Bates College. He enlisted in 1861, participated in many of the important battles during the Civil War and in 1866 was made a lt. col. 5th U.S. Vet. Vol. Inf. During the same year he was honorably mustered out but re-entered the army with the rank of captain and afterwards served in the Spanish American War also in the Philippine Islands and in China at Yangtsun. After advancing through various grades he was made a brigadier-general in 1901 and retired the same year. In 1903 he wrote *America in the China Relief Expedition.*

DAGGETT, MABEL POTTER. Graduated from Syracuse University in 1895. Married John Duval Daggett, Nov. 2, 1901. From 1895 to 1900 was the editor of a woman's page in The Post-Standard of Syracuse and 1900-1901 in the Sunday North American of Philadelphia. During 1902 and 1903 wrote special articles for the New York Sunday World. Was associate editor of Hampton's Magazine 1907-8 and associate editor of The Delineator from 1908-11 and again in 1919 and 1920. In 1919 was also special commissioner to France for the Butterick Publishing Co., French War Relief. Contributed special articles to various magazines and was the author of: *In Lockerbie Street—A Little Appreciation of James Whitcomb Riley*, 1909; and *Women Wanted* in 1918.

DAGHESTAN (42° 23′ N., 46° 30′ E.), a republic, in Transcaucasia, extending along W. coast of Caspian Sea; area, 11,471 sq. miles; mostly mountainous; thickly wooded; well-watered; fertile valleys; dry climate; minerals found; inhabitants chiefly Lesghians; leading industry, sheep and cattle breeding; products—grain, cotton, silk, fruit; capital, Temir-khan-shura. Pop. 798,181.

The Republic suffered during 1922-3 from a severe and prolonged famine, accompanied by a visitation of tropical malaria. It is reported that at the end of 1922 over 150,000 people were starving and 250,000 were suffering from malaria.

DAGNAN-BOUVERET, PASCAL ADOLPH JEAN (1852), French Painter. Born in Paris, January 7, 1852. His *Death of Mamon Lescaut* Salon of 1878, and *Wedding Party in Photograph Gallery* won him popularity. The Salon awarded a 1st Class medal for *An Accident*, 1880. Among his notable paintings are *Hamlet and Grave Diggers*, *Consecrated Bread*, *Bretons at the Pardon*, 1886; *The Breton Peasant*, 1888, and *The Lord's Supper*, 1896; *Spanish Dancer*, 1909, and *Marguerite au Sabat*, 1912. See Vandyke 'Modern French Painters.'

DAGO, slang term for Span., Portug., and Ital. sailors and others belonging to the Mediterranean littoral.

DAGOBERT I. (*d.* 639), greatest of Merovingian kings; succ. his *f.* as king of the Franks, 629, curbed disorder of nobles and Church, encouraged art, sent out Christian missionaries, made equal alliance with Byzantine empire.

DAGON, Philistine fish-deity, worshipped at Gaza and Ashdod.

DAGUERRE, LOUIS JACQUES MANDE (1789-1851), Fr. painter of panoramic views; invented the diorama, and after prolonged experiments with J. N. Niepce, later alone, the *daguerrotype*, the forerunner of modern photography. The discovery was made public by Arago in 1839. Daguerrotype Process, see PHOTOGRAPHY.

DAGUPAN (16° 2′ N., 120° 40′ E.), town, in Gulf of Lingayen, Luzon, Philippine Islands; commercial center; exports sugar, indigo, rice, and salt. Pop. 20,000.

DAHABEAH, Arab. name for Nile passenger boat.

DAHLGREN, JOHN ADOLF (1809-1870), American naval officer. He joined the navy in 1837, and became a commander in 1855. Assigned to ordnance duty in 1847 he invented the Dahlgren guns, and a new way of arming gun-boats to throw cannister and shrapnel from howitzers. Commanded South Atlantic squadron in 1863, and Admiral Foote's fleet before Charleston when the latter died. He assisted Sherman in the capture of Savannah and commanded the South Pacific fleet in 1866. Was chief of Ordnance Bureau 1868-70, and appointed head of Washington navy yard just before his death. Author *Systems of Boat Armament in U.S. Navy*, etc.

DAHLGREN, ULRIC (1870), *b.* in Brooklyn, N.Y. Was a student at the State Model School, Trenton, N.J. from 1883-5; graduated from Mt. Pleasant Military Academy, Ossining, N.Y. in 1890 and from Princeton University in 1894, M.S. 1896. Was instructor, in 1906, and professor in biology from 1911 at Princeton University. In 1899 was assistant director Marine Biol. Lab., Woods Hole, Mass., trustee of Harps-well (Me.) Biol. Lab. from 1912-16 and director same in 1921. Also member several important scientific societies. Wrote zoöl. memoirs in American and German journals, mostly on the production of light and electricity by animals and was the author of: *Principles of Animal Histology*, 1908; and *Production of Light by Organisms* in 1915.

DAHLIA, genus of tuberous-rooted herbs with composite flowers indigenous in Mexico and Central America. Many varieties are popular garden plants.

DAHLMANN, FRIEDRICH CRISTOPH (1785-1860), Ger. author and politician; app. prof. at Kiel, 1812, and stirred up patriotic feeling in Schleswig-Holstein against Denmark; obtained chair at Göttingen, 1829; banished after protest of Göttingen profs., 1837, against dictate of king of Hanover; wrote valuable hist. works and took important part in bringing about union of Germany, 1849.

DAHN, JULIUS SOPHUS FELIX (1834), Ger. poet, novelist, historian, and jurist; rector of Breslau Univ. 1895. His numerous publications include many legal works and books on Ger. history.

DAHOMEY (7° 25′ N., 1° 30′ E.), division of W. Africa, belonging to France; situated on coast and stretching inland; bounded by Ger. Togoland on W.; Lagos and Yoruba on E.; and by Gulf of Guinea on S.; capital, Porto Novo; area, c. 60,000 sq. miles. Coast (extending c. 80 miles) consists largely of islands and swamps, separated by lagoons and channels, and protected from the ocean by long barrier of sand, which affords good navigation. The interior is fairly level, with gentle slope and plain stretching from Great Swamp in direction of Kong Mts.; several mt. ranges; many springs and small rivers which flow into Avon and Denham lagoons; magnificent forests—baobob—palms and fruit trees. Among wild animals are the lion, elephant, leopard, hippopotamus, and monkey. Oil-palms grow generally in neighborhood of towns, and large quantities of palm-oil are made. Important settlements are Abomey (former capital), Allada, and Savi. People are good agriculturists and potters; many well-cultivated farms to be seen on coast.

D. state dates back to XVIII. cent.; formerly ruled by absolute monarchs who were deified; last ruler deposed by French in 1900, the kingdom having been entirely won over by 1894. Fetish-worship formerly prevailed and serpent worship on the coast with savage and murderous rites. See Map Africa. Pop. 861,000.

DAIMLER ENGINE. See Automobile.

DAINGERFIELD, ELLIOTT (1859), American artist. Born at Harpers Ferry, Va. Studied art in New York and Paris. He painted the Lady Chapel of the Church of St. Mary the Virgin, New York, 1892, and gave public lectures on art. Director Permanent Art School, Blowing Rock, N. C. Among his important works are *Madonna and Child* (Property of Haley Fiske), *Child of Mary, Story of the Madonna*, 1902. *Slumbering Fog*, Metropolitan Museum. Awarded Silver medal, Buffalo Exposition and Clark Prize, National Academy of Design, 1902. Author of monographs on George Inness and R. A. Blakelock.

DAIRYING, one of the most ancient industries engaged in by man, and one of the first influences tending toward settled civilization. The keeping of goats and sheep first diverted savage tribes from warfare and hunting as a means of subsistence, turning the warrior into a shepherd. In most primitive countries, goats and sheep are still the basis of dairying. Cows, or oxen, where domesticated as far back as there are historic records, but it was in the northern countries of Europe that they were first bred for milk-giving purposes. Great Britain and Denmark are preeminently the homes of the modern dairy industry. In the United States cows have always been the basis of dairying, and even in colonial days the vast areas of pasturage favored the importation of dairy cattle. The production of milk has always been evenly distributed over the country, in ratio to the population, since this phase of the industry depends on local markets, but the manufacture of cheese and even of butter has been more or less concentrated in the central prairie states, where grazing is more plentiful and grain may be raised more cheaply. Dairying is, of all agricultural industries, the one that has always adapted itself to the co-operative method of marketing. The preeminence of Denmark as a dairy country has been entirely due to the fact that co-operative methods were there first adopted. It was among the dairymen of this country that agricultural co-operation first developed. Twenty and thirty years ago co-operative creameries and cheese factories appeared in Minnesota, Iowa, Wisconsin and other states in that part of the country. This is due to the fact that the actual care of dairy cattle is essentially an enterprise for individuals, not adapted to large scale operations, while the production of butter and cheese, especially the latter, is performed more economically on a larger scale. Thus, while caring for the cattle as individuals, dairymen combine for the purpose of manufacturing the raw product, milk or cream, into cheese or butter. Milk production for the use of city consumers is a phase of American dairying which has suffered during recent years from over-production. As a result co-operative marketing has in this department also made its appearance, taking the form of dairymen's leagues, such as that which was organized in New York, in 1916. These rather resemble agricultural labor unions, since the object is to maintain a high price. The United States has always been an exporter of cheese, and, in more recent years, of condensed milk. Together with other agricultural industries, dairying in this country suffered severely from the curtailment of foreign trade after 1920. According to the U.S. Census Bureau there were in this country in 1920, 20,892,341 dairy cows, of two years and over. The value of dairy products in 1919 was estimated at $1,481,462,091. In 1921 the total production of milk in the United States was 98,862,276,000 lbs., the number of milch cows on farms being estimated at over 24,000,000, a gain of nearly 4,000,000 since 1920. The total production of creamery butter was 1,054,938,000 lbs., in 1921, while the production of cheese was 355,838,000 lbs. See MILK and MILK PRODUCTS.

DAIS, raised floor in mediæval dining-hall, where high table stood.

DAISY, GOWAN (*Bellis perennis*), common composite plant occurring in Europe, Asia Minor, and N. America.

DAKAR (14° 39′ N., 17° 24′ W.), fortified town, capital of Fr. W. Africa, on Gulf of Goree, Cape Verde; magnificent harbor; chief Fr. port on W. coast. Pop. 19,000.

DAKIN, HENRY DRYSDALE (1880), *b.* in London, Eng. B.Sc. Victoria University, Manchester, Eng. 1901; D.Sc., University of Leeds, 1907. Also studied at the University of Heidelberg in Germany and received hon. Sc. D. from Yale University. Was demonstrator in chemistry at the University of Leeds, 1901-2; was research worker for the Lister Institute of Preventive Medicine, successively at London and Heidelberg from 1901-5 and Herter Lab., N.Y. City from 1905 to 1920. Author: *Oxidation and Reductions in the Animal Body*, 1912: and *Handbook of Chemical Antiseptics* in 1917.

DAKIN'S SOLUTION. An antiseptic liquid consisting of a solution of sodium hypochlorite containing boric acid. It is stated that the solution was first prepared by the great French chemist, Berthollet, in 1788, but it was very little used until recent years, when it was introduced by Dr. D. H. Dakin, of New York, into the French military hospitals. It was employed by him for irrigating wounds and the success which attended its use as a cleansing and healing agent attracted much attention. Its valuable properties are believed to be due to its oxidizing action, brought about either indirectly, through the formation of chloroamide groups, or directly by the decomposition of the hypochlorite itself. The solution is usually prepared from chlorinated lime, known, chemically, as calcium hypochlorite. The chlorinated lime is dissolved, and to the clear solution is added a strong solution of sodium carbonate. Chemical interaction brings about the formation of calcium carbonate (chalk) which settles as a precipitate, and sodium hypochlorite, which remains in solution. The clear liquor is decanted and neutralized with boric acid.

DAKOTA WESLEYAN UNIVERSITY. In 1882 the Dakota Mission Conference in session at Parker, resolved to found a Wesleyan University under Missionary auspices and a charter was obtained in 1883. The money was raised by selling lots in the University addition to the city of Mitchell. In 1885 a new charter was obtained for a high-grade institute of learning to be founded at Mitchell, under control of the Methodist Episcopal Church. The institution was opened in the fall of 1885, the directors being appointed by the Conference. On March 9, 1888, all the buildings were destroyed by fire, but the work went on in temporary quarters. The new structures were of granite. In 1922-23 the teachers numbered 34; students 419.

DALAGUETE (*c.* 10° N., 124° E.), town, at mouth of Tapon, E. coast of Cebü, Philippine Islands. Pop. 22,000.

DALBEATTIE (54° 57′ N., 3° 48′ W.), town, Kirkcudbrightshire, Scotland; important granite quarries in district. Pop. 4,000.

DALBERG, name of Ger. noble family taken from their property of D. They received (1494) right of precedence in obtaining knighthood at coronation of emperor. Prominent members were Johann (1445-1503), noted patron of letters, Karl Theodor Anton Maria (1744-1817), important statesman of Empire.

D'ALBERT, EUGENE (1864), pianist and composer, *b.* at Glasgow. Studied music with his father and at the National Training School, London, under Arthur Sullivan, and with Richter, Vienna and Liszt, Weimar. Appointed Court Pianist, Weimar, he played in America in 1892-93 and in 1904-05. He excelled with works of Bach and Beethoven. Composed the operas *Ghismonda*, 1895; *Gerard*, 1897; *Kain*, 1900; *Der Improvisatore*, 1900; *Tiefland* (produced at the Metropolitan, N.Y.) *Tregaldabas*, 1907; *Izell*, and *Libeskettan*, 1913.

DALE, ALAN (ALFRED J. COHEN) (1861), *b.* Birmingham, Eng. Was educated in King Edward's School at Birmingham, and passed the junior and senior 'local' examinations at Oxford University. Was dramatic critic for the New York Evening World, the New York Journal, The New York American and later wrote for the Cosmopolitan News Service. Author: *Jonathan's Home*; *A Marriage Below Zero*; *An Eerie He and She*; *My Footlight Husband*; *Miss Innocence*; *An Old Maid Kindled*; *A Moral Busybody*; *Conscience on Ice*; *His Own Image*; *A Girl Who Wrote*, 1902; *Wanted—A Cook* and *The Great Wet Way* in 1909 and *The Madonna of the Future* and *When a Man Commutes* in 1918.

DALE, ROBERT WILLIAM (1829-95), Eng. Congregationalist minister, and important exponent of Nonconformist opinion; wrote *History of Congregationalism*, pub. 1907.

DALE, THOMAS NELSON (1845), *b.* in New York City. Received a general education in Europe and Williston Seminary, Mass., and geological training under Zittel and Pumpelly. Became connected with the U.S. Geological Survey in 1885 and was geologist from 1892-1921. Was also an instructor in geology and botany at Williams College from 1893 to 1901. Author: *A Study of the Rhaetic Strata of the Val di Ledro in the So. Tyrol*, 1876; *The Outskirts of Physical Science*, 1905; *Slate Deposits and the Slate Industry of the United States*, 1906; *The Marbles of Western Vermont*, 1912; *The Scientific Spirit Applied to Living Subjects* (essays), in 1913, and also wrote reports on geological subjects.

DALECARLIA (61° N., 14° 30′ E.), former province, Sweden, now forming county of Kopparberg.

DALHOUSIE, EARL OF, JAMES ANDREW BROUN-RAMSAY, (1812-60), Brit. administrator; *b.* at Dalhousie Castle, in Midlothian; succ. Gladstone as Pres. of Board of Trade, 1845-46; gov.-gen. of India, 1847-56, during which time British conquered or annexed large dominions, and railways, canals, telegraphs, etc., revolutionized India; cr. marquess, 1849. After war of 1848-49 D. on his own authority annexed Punjab, organized expedition which resulted in annexation of kingdom of Pegu, 1853; introduced policy of considering native states escheats to crown on failure of heirs-male, and thus made pretext for annexation of Nagpore, 1853; Annexation of Oude, 1856, considered crown of D.'s career.

DALKEITH (55° 54′ N., 3° 4′ W.), market town, Midlothian, Scotland. Dalkeith Palace is seat of Duke of Buccleuch; D. is important agricultural center; has weekly grain markets; carpet making, iron- and brass-founding are chief industries. Pop. 7,000.

DALL, WILLIAM HEALEY (1845), *b.* in Boston, Mass. Received his education in public schools and was a pupil in natural sciences under Louis Agassiz, also took special courses in anatomy and medicine (hon. A.M., Wesleyan, 1888; D.Sc., University of Pennsylvania, 1904; LL.D., George Washington University, 1915). Was a Lt. in the International Telegraph Expedition to Alaska, 1865-8, and was connected with the U.S. Coast Survey in Alaska from 1871-84. In 1880 was made hon. curator of the U.S. National Museum, became professor invertebrate paleontology at Wagner Institute of Science, Philadelphia, in 1893 and from 1884-1921 was paleontologist of the U.S. Geological Survey. Author: *Tribes of the Extreme Northwest*; *Scientific Results of the Exploration of Alaska*; *Reports of the Mollusca of the Blake Expedition; Alaska and Its Resources*; *Coast Pilot of Alaska*; *Biography of Spencer Fullerton Baird*, and also various monographs.

DALLAS, a city of Texas, in Dallas co., of which it is the county seat. It is on the Gulf, Colorado and Santa Fe, the Missouri, Kansas and Texas, the Chicago, Rock Island and Pacific, and other railways, and on the Trinity river. Dallas is the largest city of northern Texas. It has an area of 19 square miles and although its growth has been rapid it is well and attractively laid out. The city lies within the grain belt of the state and has also large cotton, mining, manufacturing and commercial interests. It is the chief industrial city of Texas and is also the largest interior cotton market in the United States. The chief industries are the manufacture of cotton machinery, leather goods, dressed meat, cotton goods, cement, clothing, and foundry and machine shop products. The streets of the city are well paved and has excellent water supply. The most notable public buildings include a United States courthouse, Texas State Fair and Dallas Exposition buildings, several cathedrals and churches. It is the seat of the Southern Methodist University and St. Mary's College. There is a park system of over 800 acres and a boulevard system of over 60 miles. Pop. 1920, 158,976.

DALLAS, ALEXANDER JAMES (1759-1817), statesman, lawyer, and writer; famous for success in founding Amer. bank, 1817, and financial administration.

DALLAS, GEORGE MIFFLIN (1792-1864), American diplomat, *b.* at Philadelphia, *d.* there. Admitted to the bar in 1813; he entered diplomatic service. Elected senator for Pennsylvania in 1831, he was minister to Russia, 1837-1839; and in 1844 was elected Vice-President of the U.S. As president of the Senate his casting vote in 1846 repealed the protective tariff of 1842, and caused much indignation as he was believed to be a protectionist. He was U.S. minister to Great Britain, 1856-1861. *A Series of Letters from London* and *Life of E. J. Dallas* written by him were published after his death.

DALLES, a name given to several rapids and cataracts in North America. The largest is the Great Talles of Columbia which is about 200 miles from the mouth of the river where its flow is compressed by high rocks into a swiftly flowing torrent about 60 yards wide. The Dalles of St. Louis are a series of cataracts near the city of Duluth, Minn.

DALLES, THE, a city of Oregon, in Wasco co., of which it is the county seat. It is on the Great Southern, and the Oregon, Washington Railroad and Navigation Company railroads, and on the Columbia river, 85 miles east of Portland. It receives its name from the rapids of the Columbia river which are in the neighborhood. The city is an important shipping point for grain, livestock and wool. Its industries include tanneries, flour mills, canning factories, etc. There are several important public and private institutions including a Catholic Seminary for Girls, Carnegie Library, hospital, and an academy. Pop. 1920, 5,807.

DALLIN, CYRUS EDWIN (1861), American sculptor, *b.* at Springville, Utah, November, 1861. Studied at Paris art schools and under Chapu. Exhibited at Paris Salon of 1890; first class medal at Chicago Exposition, 1893; silver medal Paris Exposition, 1900; and gold medal St. Louis Exposition, 1904. First prize for soldiers and sailors monument, Syracuse, 1906; gold medal, Paris Salon, 1909; and Panama Exposition, 1915. Instructor Mass. State Normal Art School, Boston. His important works include *Signal of Peace*, Lincoln Park, Chicago; *Isaac Newton*, Congressional Library; *Pioneer Man*, Salt Lake City; *Great Spirit*, Boston Museum of Art; *The Scout*, Kansas City; and *Massasoit*, Plymouth, Mass., 1921.

DALLMEYER, JOHN HENRY (1830-83), Anglo-Ger. optician; manufactured telescopes; authority on photographic lenses; on the council of Royal Photographic and Royal Astronomical Societies.

DALMATIC, a vestment which took its name from a species of Rom. tunic worn in the first centuries of Christian era; adopted by pope and deacons, and later used by deacons and subdeacons of the R.C. Church; has wide, straight sleeves, skirt split at sides, and two vertical joined by two horizontal stripes.

DALMATIA, coast province, Jugo-Slavia (43° 50′ N., 16° 10′ E.); a narrow, mountainous country, with numerous islands on N.E. coast of Adriatic Sea; breadth, 2-40 m.; mountain ranges include W. chains of Dinaric Alps, Dinara, *c.* 6,000 ft., and Karst plateaus. Coast is indented with numerous harbors and bays, the most important being Cattaro, Ragusa, Spalato, Sebenico; many islands, including Pago, Brazza, Lesina, and Curzola; principal river is Narenta, in S. Climate is sub-tropical; the sirocco is felt in spring, bora, in winter; mean annual temp., 59° on coast. Country is mostly pasture land and woods, and produces timber, wine, olive oil; shipbuilding is carried on in some islands; iron, lignite, asphalt, and salt are found; principal agricultural products, corn, rye, barley, and fruits; famed for Maraschino liquor; large quantities of fruit; little manufacturing done; famous lace school in Spalato. Inhabitants are mostly Serbo-Croats and Italians; over 80 per cent. R.C. Cap. Zara.

Dalmatia was conquered by Romans, *c.* 400 B.C.; occupied by Slavs in VIII cent.; passed to Venice in Middle Ages; became independent republic, then fell into Austria's possession; taken by Napoleon, 1805; became united to Italy, then Illyria, and returned to Austria in 1815. During World War, by Pact of

London, 1915, Dalmatian islands and N. Dalmatia were assigned to Italy; but claims of Jugo-Slavia could not be overlooked and Dalmatia became a part of the Republic of Jugo-Slavia by the Treaty of Rapallo, in 1920. See ITALY. Area, 5,090 sq. m.; pop. 621,500. See MAP NEW S. E. EUROPE AND JUGO-SLAVIA.

DALMELLINGTON (55° 20′ N., 4° 23′ W.), village, Ayrshire, Scotland; collieries and ironworks.

DALMORES, CHARLES (1871-), tenor opera singer, b. at Nancy, France, December 31, 1871. Studied the violin at the Nancy Conservatory, but owing to an injury to his arm he gave it up, to study the horn. In 1888-1904 he was 'cellist in the Lamoureaux orchestra, Paris. He next studied vocal culture and made his debut as a singer at Rouen, in 1904; Oscar Hammerstein engaged him in 1906 for his Manhattan Opera Company. In 1912 he became first tenor of the Chicago Opera Company. His most popular roles are *Nicias* in *Thaïs*; *Julien* in *Louise*; *Vinicius* in *Quo Vadis* and *Samson* in *Samson and Delilah*.

DALRADIAN, complicated series of metamorphic rocks, consisting chiefly of schists and limestones, of the Highlands of Scotland and N.W. Ireland.

DALRIADA.—(1) ancient name for a district now forming northern part of County Antrim, Ireland. (2) ancient name for part of Argyllshire, Scotland; founded by Dalriads from Ireland c. 500 A.D.; united with the northern kingdom of the Picts under King Kenneth, in 843.

DALRY (55° 43′ N., 4° 43′ W.), town, on Garnock, Ayrshire, Scotland; worsted spinning and machine knitting, box and cabinet making. Pop. 5,000.

DALRYMPLE, SIR DAVID, LORD HAILES (1726-92), a Scottish judge and historical antiquary, was born at Edinburgh, the great-grandson of the first Viscount Stair. After being educated at Eton and Utrecht, he was called to the Scottish bar in 1748, becoming judge of the Court of Session as Lord Hailes in 1766, and a judge of the criminal court in 1776. He served in these capacities with ability, if not with distinction, but he is chiefly remembered for his literary work, his friendships, and his controversies. He thought Hume's *Inquiry* atheistic, and refused to revise it in 1758 on that ground. He had a controversy with Gibbon in 1786. He was much esteemed by Dr. Johnson, who, nevertheless, adjudged him below Goldsmith as an historian, and who revised his chief work, *Annals of Scotland*, 1776.

DALRYMPLE, SIR JAMES, 1ST VISCOUNT STAIR (1619-95), a Scottish lawyer and politician, b. at Drummurchie, Ayrshire, and educated at the universities of Glasgow and Edinburgh. He was professor of philosophy at Glasgow from 1641-47, when he was admitted an advocate in Edinburgh. He was appointed secretary to the commissioners sent to Charles II. by the Scottish parliament, 1650; a judge of the Court of Session, 1657; and Lord President of the Court of Session, 1671. He wrote *Institutions of the Law of Scotland*, 1681; and a Latin work, *Physiologia Nova Experimentalis*, 1686. He was created Viscount Stair in 1690. Consult Graham, *Annals and Correspondence of the Viscount and First and Second Earls of Stair*, 1875.

DALRYMPLE, SIR JOHN, 2ND EARL OF STAIR (1673-1747), a Scottish general and diplomatist, born at Edinburgh. He was educated at the universities of Leyden and Edinburgh, and in 1701 joined a Scottish foot regiment and served in Marlborough's campaigns. He succeeded to the earldom in 1707, and was made Privy Councillor and commander-in-chief of the forces of Scotland. He served with high distinction at the battles of Oudenarde, Malplaquet, and Ramillies. He acted as British ambassador in France, 1708, and in Holland, 1742, and in 1743 fought at the battle of Dettingen. At his seat in New Liston, Edinburgh, he devoted much time to agriculture, and was the first to plant turnips and cabbages in open fields.

DALTON, a city of Georgia, in Whitfield co., of which it is the capital. It is on the Southern, and the Western and Atlantic railways, 100 miles northwest of Atlanta. Its favorable climate makes it a favorite summer resort both in summer and winter, especially for people from the north. It is an important industrial city and has canning factories, cotton compresses, foundries, machine shops, flour mills, etc. Dalton was a place of considerable strategic importance during the Civil War and was much damaged by Sherman's army during his march through Georgia. Pop. 1920, 5,222.

DALTON, ALBERT CLAYTON (1867-), an American army officer, b. at Lafayette, Ind. He joined the army in 1889 and after participating in campaigns against the Cheyenne and Sioux Indians, was made a 2nd Lieut. in 1891. He graduated from the Infantry and Cavalry School at Fort Leavenworth.

Kan., in 1895, and after advancing through various grades was made a Lieut. Col. in 1917. He took part in the Santiago campaign in 1898, was cited for gallantry in action during the Philippine Campaign, 1899-1902; was with the Army of Cuban Occupation, 1907-9; the Vera Cruz Expedition in 1914 and was on the Mexican border, 1916-17. During 1917 and 1918 he was general superintendent of the Army Transport Service in charge of the shipping of supplies and the embarkation of troops for Europe with the temporary rank of Col. and later brig.-gen. and in 1919 commanded the 18th Infantry Brigade, 9th (Regular) Division in France.

DALTON, JOHN (1766-1844), Eng. chemist and physicist; *b.* of a Quaker family in Cumberland; became a teacher in Manchester in 1793, and there continued meteorological observations which he entered until the day before his death. D. communicated a paper to the Manchester Literary and Philosphical Soc. on color-blindness (*Daltonism*), with which he was afflicted, and from 1801 onwards pub. numerous papers on the properties of gases. His most important work, however, is his enunciation of the atomic theory. He delivered courses of lectures, 1803-10, at the Royal Institution, London, in Glasgow, and in Edinburgh; elected F.R.S., 1822.

DALTON-IN-FURNESS (54° 9′ N., 3° 12′ W.), market town, Lancashire, England; with extensive iron works; ruins of Furness Abbey in vicinity. Pop. 11,000.

DALY, ARNOLD (1875), American actor, *b.* in Brooklyn, New York, October 4, 1875. He made his first stage appearance in *The Jolly Squire* in 1892. Rapidly advancing in his profession he gained special distinction in *Candida* by Bernard Shaw in whose plays he subsequently appeared including *Mrs. Warren's Profession, You Ne'er Can Tell, Man of Destiny,* etc. In 1911 he appeared in *Arms and the Man* in London, and in Birmingham's *General John Regan.* An actor of marked distinction and original methods his difficulty has been in finding suitable parts. In the winter of 1920-21 he appeared in repertoire at the Greenwich Village Theatre, New York.

DALY, JOHN AUGUSTIN (1838-1899), American dramatist and theatre manager; *b.* at Plymouth, North Carolina, July 20, 1838; *d.* at Paris, France, June 7, 1899. His first work was as dramatic critic on Sunday Courier, and other papers, and meanwhile he made adaptations of foreign plays. His first original piece *Under the Gaslight* was produced at a New York theatre in 1867. He became manager of the Fifth Avenue Theatre, on Twenty-fourth street, where many notable stars appeared including E. L. Davenport, Mrs. Scott-Siddons and Clara Morris. The theatre was destroyed by fire, and he opened a new Fifth Avenue Theatre in 1874, managing it for three years. Daly's Theatre on Broadway near Thirtieth street, 1879, was long famous. Old English comedies such as *The Country Girl* and Shakesperian revivals were among the more notable productions of this theatre. The Daly Company visited Europe, playing in England, France, and Germany, and in 1893 a Daly's Theatre was established in London.

DALY, THOMAS AUGUSTINE (1871), *b.* in Philadelphia, Pa. Was educated in public schools and Villanova College, in Pennsylvania and also attended Fordham University to close of Sophomore year, 1889; hon. A.M., Fordham University, 1901; and Litt.T., same, 1910; LL.D., Notre Dame University, 1917; LL.D., Boston College, 1921. Was connected with the Philadelphia Record from 1891-8 as reporter and editorial writer; general manager of the Catholic Standard and Times, from 1898-1915; was associate editor of the Evening Ledger, Philadelphia, 1915-18 and in 1918 became editor of the Philadelphia Record. Was author of *Canzoni*, 1906; *Carmina*, 1909; *Madrigali*, 1912; *Little Polly's Poems*, 1913; *Songs of Wedlock*, 1916, and *McAroni Ballads*, in 1919.

DALYELL, THOMAS, DALZELL (*c.* 1599-85), Scot. Royalist commander; defeated Covenanters at Rullion Green; notorious for cruelty to Covenanters taken as prisoners.

DAM, an artificial obstruction to raise the level of a stream, or river usually for the purpose of creating a stored reserve for agricultural or domestic use, or to create a fall of water to supply power. Such feats of engineering are as ancient as history, it being recorded that the Egyptians dammed Lake Moeris, 4,000 B.C. to regulate the flow of the Nile. In India and China dams were built to divert the flow of streams over tilled rice fields at least a thousand years ago. In the United States the damming of flowing waters has assumed an important aspect in the arid regions, where, without such an aid to agriculture, vast areas would still be desert lands. Formerly all dams were nothing more than earth embankments, faced with stones. Modern engineering has differentiated them, not only in the material of which they are constructed but into kinds of which each is especially adapted to peculiar conditions. Dams are now constructed of earth, timber, loose stone, masonry or concrete, and steel. All must meet certain common needs. The danger to be guarded against is from overturning, from pressure; erosion; splitting or cracking, in the case of masonry; and sliding of the base. In earth dams there is danger from the borings of crayfish and muskrats. Earth dams are built sloping on both sides, but with the longer, or flatter, slope toward the water, the latter being usually three times as horizontal as high. The pressure from the water behind the dam, it must be remembered, is not in proportion to amount, but in proportion to depth, or height. Greater care must, therefore, be taken with the slope facing up-stream. Here the earth is built up in layers, each tamped and wetted and finally faced with stone, to prevent erosion from lapping waves. Sometimes there is a core of masonry, the base of which goes below the bottom of the reservoir, or lake, created by the dam, to prevent seepage. The minimum thickness at the top is ten feet, and thirty feet is considered within a margin of safety. Proper sluice gates or spillways must prevent the surface of the water ever rising within six feet of the top. The outstanding examples of modern earth dams are the Ekrud Dam, in India, which is 7,300 feet in length, 72 feet in height; the Belle Fourche Dam, in South Dakota, 6,493 feet in length, 122 feet high, 19 feet wide at the top and 620 feet wide at the base, the up-stream slope being covered with clay rolled in layers and concrete slabs. Timber dams were commoner in the early days when construction was more hasty and Portland cement was more expensive. Generally such a dam resembles a fence of heavy timbers, backed and faced with earth or loose rocks. The New Hartford Dam, in Connecticut, is the best example of this class; it is 232 feet in length, 21 feet high, 68 feet wide at the base, its timbers being from nine to twelve inches in thickness, set six feet apart, with stones between, the up-stream being planked with oak. It has withstood an overflow of water ten feet in depth, pouring over its top. Masonry and concrete are the materials with which the modern dams of large size are constructed. These may be divided into three classes; those in which gravity is the basic principle, capacity to withstand pressure depending on mere weight and size; arched dams, in which the arch is employed as a principle, the dam itself sometimes being a huge arch turned inward; and hollow dams, in which the water face is supported by buttresses. Usually rock bottom is sought on which to build. Not only is the loose silt or clay cleared away, but cracks in the rock are carefully cleaned out and filled with concrete. But where it is impossible to find rock bottom it is still feasible to erect a masonry dam. The huge barrage dam across the two mouths of the Nile, in Egypt has no rock base. In such a case piling is driven in as a base, and silt and clay are filled into the river bed for some distance above the base as a preventive against undermining. The biggest dam in the world is of this class; the Assouan Dam, built across the Nile, to regulate the flow for agricultural purposes, having made of Egypt one of the important cotton growing countries. It is 6,400 feet in length, 112 feet high. Next in size comes the New Croton Dam, at Croton Lake, built to increase the water supply of New York City. It is 1,168 feet in length, 297 feet high and has a 1,000 foot spillway. The Roosevelt Dam, in Arizona, 680 feet long, 260 feet high and 158 feet broad at the base, is another of this type. Steel dams are not numerous as a class, for steel is not as durable as wood and needs constant care, but some have been built in the United States, of which the Ash Fork Dam, in Arizona, is the best example. It is 184 feet long and 46 feet in height, its face consisting of huge steel plates riveted to 20-inch I-beams. Movable dams are another minor class, being usually employed in connection with canals, where overflows must be regulated. In a movable dam the top is raised, either automatically, or by power, to meet a rise in the level of the water. In the automatic kind the water floats a hinged barrier upward as it rises and so regulates the overflow. The dam of the water-power plant at Lockport, Ill., connected with the Chicago Drainage Canal system, has a long, wooden leaf split and hinged in the middle which, stretching across the top of the dam, when the water rises these two hinged flaps are lifted in the middle by a machine, in the form of a roof, and the flow is checked. Another device is a huge cylinder, which rolls on tracks up the inner face and so becomes an additional top. In Schweinfurth, Germany, there is one of this type, the cylinder being 13 feet in diameter, closing a gap 59 feet across. In 1921-2 several big dams were in process of construction in the United States. One of these is the Rimrock Dam, designed to create an artificial lake seven miles long and a mile wide, to be used for the irrigation of the Yakima Valley, in the

State of Washington. When completed it will be 900 feet long, 222 feet high and contain over 1,785,000 cubic yards of material. The Hetch Hetchy Dam, across the Tuolumne river, California, in connection with the water supply of San Francisco, was begun in 1921. According to plans this is to be over 340 feet in height. Other dams in process of construction are at Wichita Falls, Texas, the San Pablo Dam, Oakland, Cal., and the Calaveras Dam, to increase the water supply of San Francisco, Cal. Among the great dams built in the United States are the Elephant Butte Dam in the Rio Grande river, and the Arrowrock Dam in Idaho, 349 feet, the highest in the world.

D'AMADE, ALBERT (1856), Fr. general, was military attaché to Fr. ambassador in London, 1901-4, and during World War was successively commander of the northern territorial divisions, 1914; commander of the Fr. army in the East, 1915; member of Fr. military mission to Russia, 1915; inspector-general of the 5th Arrondissement at Lyons, 1916; and commandant of the 10th Region at Rennes, 1917.

DAMAGES, compensation claimed by persons for breach of contract, loss sustained, infringement of copyright, slander, libel, breach of promise, etc. As regards breach of contract, Baron Park expressed the opinion that 'the rule of the common law is, that where a party sustains a loss by reason of a breach of contract, he is, so far as money can do it, to be placed in the same situation with respect to damages as if the contract had been performed.' Damages cannot be recovered if they are too remote; nor can they be based on the intention of punishing the party who has committed the breach. But in assessing the damages respect may be paid to prospective loss arising from the refusal of the defendant to perform his contract. In regard to loss or depreciation of goods sustained by land or sea, the consignee is the proper person to claim damages unless the goods are sent on approval, when the consignor must make the claim.

DAMAN, DAMÃO (20° 23′ N., 72° 32′ E.), seaport town, belonging to Portuguese, on Gulf of Cambay, Bombay, India; teak forests; cotton-weaving, fisheries; Portug. settlement since 1558. Area, 150 sq. miles. Pop. *c.* 60,000.

DAMANHUR (31° N., 30° 30′ E.), town, Behera, Egypt; occupies site of ancient Hermopolis; manufactures cotton goods; important station on Cairo-Alexandria railway. Pop. *c.* 39,000.

DAMARALAND, central province, protectorate of S.W. Africa (22° 58′-19° 30′ S., 13°-20° E.), extends from Atlantic Ocean inland to Kalahari dist.; mountainous; copper, iron, zinc, gold, but only copper exploited; stock-raising country (Hereros decimated by Germans, 1904-7). Harbor, Walfish Bay. Became German in 1884; captured by S. Africans, 1915. Pop. *c.* 100,000 (13,000 Europeans).

DAMASCENING, Oriental, now particularly Persian, art of ornamenting weapons and armor, by deep incision of the pattern into which gold or silver threads are hammered. The term is also applied to the production of a peculiar blade steel with a watered pattern, by twisting welding strips of different steel together, or by corrosion.

DAMASCUS, city, cap. of Syria (33° 30′ N., 36° 18′ E.), beautifully situated on plain surrounded by orchards at base of Anti-Lebanon Mts., is probably the oldest city in the world still inhabited. It is enclosed by ruined walls with towers, and has a palace, citadel, handsome baths, mosques, and bazaars. Great mosque was partly destroyed by fire in 1893. Most of the streets are narrow, and houses ruinous. Damascus is great caravan center, and manufactures embroidered goods, inlaid and metal work, jewelry. In the period before the World War German and Austrian trade flourished in the city, the chief imports being woolens, raw cottons, silks, tobacco, sugar, petroleum, and leather. The Damascus-Mecca railway was completed as far as Medina in 1908. The city is now lighted by electricity, and has electric-car system. Damascus is sacred city to Mohammedans, and dates back to beginning of history; flourished under Jewish and Roman rulers, but was supplanted by Bagdad in VIII. cent. It was taken by the Turks in 1516, since when it remained down to the close of the World War a Turk. possession, except between 1832 and 1840, when it was held by Mehemet Ali of Egypt. During the World War it was an important center of Turk. military activity. It fell into Brit. possession on Sept. 30, 1918, and on the following day was entered by Arabs of the King of the Hejaz, within whose territory it now is.

DAMASK, figured silk, used for upholstery and hangings, originally made at Damascus; linen, or cotton, figured fabrics, generally used as table napery; adjective for 'red,' as 'damask rose.'

DAMASUS I., pope, 366-84; maintained his position with great difficulty. His forgeries of inscriptions to martyrs are archæologically important, and he encouraged the learned labors of St. Jerome.—Damasus II., pope for less than a month in 1048.

DAMGHAN (36° 10′ N., 54° 20′ E.), decayed town, Persia; large export trade in almonds. D. was destroyed by Afghans in 1723.

DAMIANI, PIETRO (*c.* 1007-72), Ital. ecclesiastic; reformed monastic life; denounced simony and marriage of priests; became cardinal, 1058, and was adviser to the pope.

DAMIEN, 'FATHER' JOSEPH (1841-89), Belg. missionary to lepers of Hawaii; *d.* of leprosy; eulogized by R. L. Stevenson.

DAMIETTA (31° 23′ N., 31° 48′ E.), town, Lower Egypt, on chief eastern branch of Nile; formerly important; several times taken and lost by Crusaders, XIII. cent.; exports grain and fish. Pop. 31,000.

DAMOCLES (IV. cent. B.C.), sycophant at court of Dionysius, who, at a banquet, suspended a sword above Damocles' head by a single thread to show how close death is to earthly felicity.

DAMOH (23° 50′ N., 79° 29′ E.), town and district, Central Provinces, India; large cattle market. Pop. 13,500.

DAMON (*c.* 400 B.C.), Pythagorean philosopher; famed for devotion to friend and fellow-philosopher, Pythias.

DAMPHON, famous Gk. sculptor.

DAMPIER, WILLIAM (1652-1715), Eng. navigator and author; buccaneer on Span. Main; app. commander of Eng. voyage of discovery to Australia, 1699, exploring district round Shark's Bay; surveyed east coast of New Guinea; commanded venture to South Seas in which Alexander Selkirk sailed; his accounts of voyages are admirable.

DAMROSCH, FRANK HEINE (1859), musical director, *b.* at Breslau, Germany, June 22, 1859. Educated at College of City of New York. Conductor of Denver Choral Club, 1882-84; Director of Music, Denver public schools, 1884. Choir Master Metropolitan Opera House, 1885-91; Director Newark Harmonic Society, 1886-7; New York Choral Club, 1891-5; New York Peoples Choral Union, 1892-1912; Orpheus Club, Philadelphia, 1897-1905; Director Music, New York public schools, Oratorio Society and Symphony Concerts for Young People, 1898-1912; Organist and Director Institute of Musical Art, 1906; Lieutenant-colonel, National Guard, 1884.

DAMROSCH, LEOPOLD (1832-85), German musician, *b.* at Posen, Prussia, October 22, 1832, *d.* at New York, February, 1885. He first practiced medicine, but gave it up for music in 1864. Toured with success as a violinist, and was musical director of Posen and Breslau theatres. Coming to America he was leader of the Arion Society, New York; founded the Oratorio Society and introduced German Opera at the Metropolitan Opera House. He was a composer of many musical pieces.

DAMROSCH, WALTER JOHANNES (1862), *b.* at Breslau, Germany, June 30, 1862. Came to the United States in 1871. Conducted Newark Harmony Society, 1881, and on *f's.* death in 1885 was director of the German Opera Company, and Oratorio and Symphony Societies, which first gave Wagner's *Parsifal* in concerts. Founded Damrosch Opera Company to perform Wagner, 1894. Toured U.S. with opera *The Scarlet Letter*, 1894. With New York Symphony Orchestra from 1893. Composer *Cyrano* opera, produced at Metropolitan, N. Y., February, 1913, and incidental music for *Iphigenia in Tarsus*, Berkeley, Cal., August, 1915, and for *Electra*, New York, February 6, 1917, etc.

DAN, Israelitish tribe, named after a *s.* of Jacob and Bilhah, originally settled in northern Palestine.

DAN (*c.* 33° N., 35° E.), ancient frontier city, Palestine; destroyed by Benhadad I., 1 Kings 15^{20}.

DANA, CHARLES ANDERSON (1819-97), American editor, *b.* at Hinsdale, N. H., August 8, 1819; *d.* at Glen Cove, October 17, 1897. He studied at Harvard but defective eyesight forced him to leave before graduating. In 1842 he joined the Brook Farm Community at Roxbury, Mass. With George Ripley he edited The Harbinger. He was managing editor of the New York Tribune, 1847-61. He was appointed Assistant Secretary of War under Lincoln. In 1866 he edited the Chicago Republican and four years later bought an interest in the New York Sun, becoming editor and proprietor until his death. With George Ripley, he edited Appleton's American Encyclopedia completed in 1863, revised 1871-77. Author of *Life of Grant*, 1868; *Art of Newspaper Making*, 1895; *Lincoln and His Cabinet*, 1896; and *Recollections*, 1897.

DANA, EDWARD SALISBURY (1849), *b.* New Haven, Conn. Graduated from Yale in 1870; M.A., 1874; Ph.D., 1876; and also studied at Vienna and

Heidleberg. Became curator of mineral collection at Yale University in 1874,and was also tutor there from 1874-9, assistant professor of natural philosophy, 1879-90, professor of physics from 1890-17 and became professor emeritus in 1917. Was the editor of the American Journal of Science from 1875. Member of the National Academy of Science and important scientific societies. Author of-*Text-book of Mineralogy*, 1877; *Text-book of Elementary Mechanics*, 1881; *Dana's System of Mineralogy*, 6th edit., 1892; *Minerals and How to Study Them*, 1895; Catalogue of American Localities of Minerals and also wrote various papers on minerals and other scientific subjects.

DANA, FRANCIS (1743-1811), Amer. lawyer and diplomatist; advocated secession from Britain and became leader of 'Sons of Liberty' in Massachusetts; assisted in oganizing army, and urged refusal of Brit. offers; representative to Russia, 1780-83; chief justice of Massachusetts supreme court, 1791-1806; member of Massachusetts Convention which ratified U.S. constitution.

DANA, JAMES DWIGHT (1813-95), Amer. geologist; mathematical teacher, U.S. navy; geologist to U.S. exploring expedition to southern seas under Wilkes, 1838. In 1850 he succeeded Prof. Silliman as prof. of natural history and geol. at Yale Coll., and collaborated with him as ed. of the American Journal of Science. Of his numerous works his *Manual of Geology* was the most widely known.

DANA, JOHN COTTON (1856), American librarian, *b.* at Woodstock, Vt., August 19, 1856. Graduated from Dartmouth, 1878, and was admitted to the New York bar in 1882. Librarian Denver Public Library, 1889-1897. City Library Association, Springfield, Mass., 1898-1901. Since that year is librarian Newark, N. J., public library. He is secretary and director of the Newark Museum Association. Publications: *Library Primer*, 1899; *Notes on Bookbinding*, 1906. Edited with Henry Kent *Literature of Libraries in 17th and 18th Centuries*, 1906-7, and with C. L. Dana *Horace, presented to Modern Readers*, 1908; *Copa*; *the Hostess of the Inn*, 1909.

DANA, RICHARD HENRY (1787-1879), American poet and essayist, *b.* at Cambridge, Mass., November 15, 1787; *d.* at Boston, February 2, 1879. He studied at Harvard and was admitted to the bar in 1811. Was associated with the North American Review from its inception in 1815, and most of his writings appeared in its pages. He lectured on Shakespeare's characters, 1839-40. His works include *Poems*, 1827; *Thoughts on the Soul*, 1829; *Poems and Prose Writings*, 1833, enlarged 1850; *The Buccaneer* is his best poem.

DANA, RICHARD HENRY, JR. (1815-82), American jurist and author, *b.* at Cambridge, Mass., August 1, 1815; *d.* Rome, January 7, 1882. He entered Harvard in 1832, but failing eyesight forced him to leave in 1834. He then went to California as a common sailor, and wrote *Two Years Before the Mast*, 1840; enlarged, 1869. A new edition edited by Dr. Grenfell was issued in 1911. He was admitted to the bar in 1840. A treatise on seamanship, *The Seaman's Friend*, was published in 1841. He made a tour of the world in 1859-60. Was U.S. Attorney for Mass., in 1861, and represented the U.S. at Jeff Davis's trial for treason.

DANAË (classical myth.), daughter of Acrisius, king of Argos, who shut her up in a tower; mother of Perseus by Zeus, who visited her in a shower of gold.

DANAO (10° 30′ N., 124° 3′ E.), town, E. coast of Cebū, Philippine Islands; center of rich agricultural district. Pop. c. 16,000.

DANAUS, legendary *s.* of Belus, Egyptian king; *f.* of the fifty Danaides who married the fifty sons of Ægyptus and, at their *f.'s* command, murdered their husbands, with one exception, on their wedding night.

DANBURITE ($CaB_2(SiO_4)_2$), rare mineral, transparent orthorhombic crystals, found in Connecticut and other parts of U.S.A., in Grisons, Switzerland and Japan.

DANBURY, a city of Connecticut, in Fairfield co., of which it is one of the county seats. It is on the New York New Haven and Hartford railroad and is 62 miles northeast of New York City It is an important manufacturing city but it is especially notable as having the largest hat factories in the United States. Its other industries include the manufacture of iron, brass, silverplateware, paper, foundry and machine shop products. There are several handsome public buildings, including a courthouse, public library, and high school. The State Normal school is here. There are public parks and a soldiers' monument. Danbury was settled in 1684, and for many years it was known by the Indian name Plaiquioque It was destroyed during the Revolution by the British general Tyron, on the ground that it was a depository for army stores. Pop. 1920, 18,943.

DANBURY HATTERS' CASE, a famous litigation in the history of capital and labor. Suit was brought by several hat manufacturers of Danbury, Conn. against strikers' organizations which had tied up the industry for some time. It was carried through the courts until on January 5, 1915 the United States Supreme Court awarded the manufacturers over $250,000 in damages, which was assessed upon the striking employees.

DANCE. the performance of a succession of rhythmic movements with the body, usually to a musical accompaniment. It is a custom which dates back to antiquity, and though amongst civilized nations it has been raised to a fine art, it constitutes an important part in the lives of most primitive and savage races (*e.g.*, the war dances of N. American Indians and Zulus). Modern dancing dates back to the 15th cent., and though often the Ital. or Span.. orgin, was generally refined, developed, and popularized in France. Catherine de' Medici, 1519-89, introduced a number of Ital. dances at the Valois court. Amongst the most popular dances of this period were the gaillarde, volta, branle, the stately and beautiful pavane, and the sarabande. In some of these dances kissing played a part, and the pavane was usually accompanied by a chanson. Another famous old dance was the courante, from which was derived the minuet, the latter being brought to a high state of perfection in France. The gavotte, originally a peasant's dance, became popular in the XVIII. cent., as also did the cotillon. The lancers, polka, schottische, quadrille, and waltz belong to the XIX. cent., though some of them, under slightly different forms, had been in use earlier. The fandango, XVIII. cent., was danced by two persons, with castanets and finger-snapping. Most countries have their peasant dances, and the charming Eng. morris dances date back to the reign of Edward III. English country dances under the Tudors were mostly kissing dances. Sir Roger de Coverley was popular before the close of the XVII. cent. The golden age of dancing in England was under. the régime of Beau Nash, XVIII. cent. Scot. national dances are the reel and strathspey; the Irish national dance is the jig. Within recent years dances with no pretensions to grace have been introduced—the cake-walk, two-step, one-step, turkey-trot, ragtime, fox-trot, bunny-hug, tango, etc. Miss Isadora Duncan's Grecian dancing popularized classical dancing, and many artists give rhythmical interpretations of the music of Chopin and other classic composers. Russian dancers, (*e.g.*) Pavlova, have brought ballet-dancing to perfection.

DANCE, CHARLES (1794-1863), Eng. burlesque writer; one of the first to use that medium.

DANCE OF DEATH, or **DANSE MACABRE,** mediæval device intended to bring home to the spectator the idea of death as a salutary influence—(*e.g.*) *Triumph of Death*, 14th cent., Campo Santo at Pisa. *Danse Macabre* is the Fr. term; at first a processional performance, later, pictures of the same; very numerous in 15th cent. in France, Germany, and England. Holbein about 1525 designed his famous series of woodcuts on the same theme. Dürer, Beham, Burckmair, and more recently Alfred Rethel, first half 19th cent., have produced similar designs.

DANDELION (*Leontodon taraxacum* or *Taraxacum officinale*), perennial composite herbaceous plant of temperate zones.

DANDOLO, name of noble Venetian family. Enrico, doge, 1193-1205, succeeded in turning aside Fourth Crusade from attack on Egypt to capture of Constantinople; rewarded for aid with Crete and other possessions of Gk. Empire. Three other members of the family were doges; Andrea, doge, 1343-54, a famous administrator, was eulogized by Petrarch.

DANDOLO, VINCENZO, COUNT (1758-1819), Ital. agriculturist; took part in the political troubles of Venice during the Napoleonic times; app. gov. of Dalmatia, 1805, he improved the sanitary, agricultural, and educational conditions of its people.

DANEGELD, land tax imposed in England to provide means for resisting the Danes, X. cent., but afterwards employed by Ethelred the Unready to buy them off; abolished in reign of Henry II.

DANELAGH, name given to district of England N. of Thames, E. of Lee, and N.E. of Watling St., ceded to Danes by Treaties of Wedmore and Chippenham, 878; N. boundary unknown, but probably D. did not extend beyond Deira; abolished by Dan. conquest of England. A large infusion of Dan. speech took place at time of D.

DANEWERK, ancient Dan. rampart in Jutland, raised as protection against Germans.

DANIEL, chief character of Bible Book of Daniel, shown by modern criticism to have been written during persecution of Antiochus Epiphanes, 175-64 B.C., not, as it purports to be, during Babylonian captivity. Partly concerned with prophecy, partly with life of D., it has been included in hagiographical, not prophetic, books of Bible. Some of it is written in Hebrew, the rest in Aramaic, and it has been suggested that it is a compilation from an uncompleted Aramaic trans. and a Hebrew original. It repeats Jeremiah's prophecy of the establishment of the Messiah's kingdom, and seems intended to comfort Jews suffering under persecution of the Seleucid king. The influence of Persia is strongly shown, (*e.g.*) in doctrine of resurrection, expressed for first time in *Old Testament*, and in system of angels among whom archangels Michael and Gabriel receive names. Identity of prophet is obscure; a Daniel mentioned in Book of *Ezekiel* was of great importance in the early history of the Jews, but cannot be made to agree in date; his deeds, it has been suggested, may have been confused by a writer of the time of Antiochus Epiphanes (whose narrative is full of historical errors) with those of a hero of the time of Babylonian captivity; Josephus, pseudo-Epiphanius and Epiphanius invented accounts of the prophet.

DANIEL, J(OHN) FRANK(LIN) (1873), *b.* in O'Fallon, Mo. Studied at Southern Illinois Normal University until 1901, was with the department of education, P.I. from 1901-5 and received S.B., from the University of Chicago in 1906; Adam T. Bruce fellow from John Hopkins, Pasteur Institute, Lille, France, 1908-9; Ph.D., Johns Hopkins, 1909. Was instructor in zoölogy at the University of Michigan from 1910-11; was instructor in zoölogy at the University of California from 1911-12, also assistant professor, 1912-17; associate professor, 1917-19, and was made professor in zoölogy, same, 1919. Author: *Animal Life of Malaysia*, 1905; also *The Elosmo branch Fishes* and wrote various papers on breeding of mice for scientific purposes, experimental studies on alcohol, and others.

DANIEL, JOHN FREDERIC (1790-1845), Eng. physicist; inventor of *Daniel cell*, a pyrometer and hygrometer, and of a process to prepare illuminating gas from turpentine.

DANIEL, SAMUEL (1562-1619), Eng. poet; author of the *Complaynt of Rosamund*, *Delia* (sonnets), a verse history of the Wars of Roses.

DANIELL, MOSES GRANT (1836-1909), American educator; *b.* in Boston. He graduated from Harvard in 1863 and for 32 years was engaged in secondary school work, principally at Roxbury Latin School (17 years) and as principal of the Chauncy Hall School, Boston, (12 years). He edited works for Ginn & Co., and was long treasurer of the Handel and Hayden Society. His Latin books for secondary school are much used.

DANIELS, JOSEPHUS (1862), editor, *b.* Washington, N.C. In 1880, at the age of 18, he edited the Wilson (N.C.) *Advance*. Five years later he became a lawyer but never practiced, continuing in journalism as editor of the Raleigh (N.C.) State Chronicle, which later became the present News and Observer, a journal whose editorial control he retained throughout his career. He also served as State printer of North Carolina from 1887 to 1893, and for two years afterward was chief clerk of the Department of the Interior. As a Democrat he emerged into national politics in the presidential campaign of Woodrow Wilson in 1912, acting as the party's publicity manager, and upon President Wilson's taking office in 1913 was appointed Secretary of the Navy. He held this post throughout the World War and until the Wilson administration ended in 1921. He was a delegate to two Democratic National Conventions and served as a member of the Democratic National Committee from 1896. His tenure of Navy portfolio produced many changes in naval administration and training. During the war period he delivered numerous addresses, later published in book form under the title of *The Navy and the Nation*. Another of his contributions to the war's literature was *Our Navy at War*, published in 1922.

DANIELS, MABEL WHEELER (1878), an American composer, *b.* at Swampscott, Mass., daughter of George F. and Maria Wheeler Daniels. After graduating from the Girls' Latin School, Boston, 1896, and from Radcliffe College, Cambridge in 1900 she studied composition with George W. Chadwick and then spent a year in Munich under Ludwig Thuille. She began writing music to two operettas for students of Radcliffe College and later composed many songs, part-songs and chorals including compositions which in 1911, received two prizes offered by the National Federation of Music Clubs. She was also the author of *An American Girl in Munich*.

DANIELS, WINTHROP MORE (1867). Political economist. Born at Dayton, Ohio, September 30, 1867. He graduated from Princeton in 1888 and studied a year at the University of Leipzig. Was professor of political economy at Princeton 1892-1911, member of the Board of Public Utilities Commission of New Jersey, 1911-1914, and of the Interstate Commerce Commission, 1914. Publications *Revision and Continuation of Alexander Johnston's History of the United States*, 1897; *Elements of Public Finance*, 1899; and *Continuation of Alexander Johnston's History of American Politics*, 1902.

DANISH WEST INDIES. See VIRGIN ISLANDS.

DANITES. See MORMONS.

DANKL, GENERAL, Austrian soldier, commanded 1st Austrian army which at outbreak of World War advanced from Galicia towards the Bug, where it was routed by the Russians.

DANNAT, WILLIAM T (1853), *b.* in New York City. Was a pupil of Munich Academy and Munkacsy Medal, Paris Salon in 1883. In 1900 exhibited at the Paris Exposition and received gold medal at the Buffalo Exposition in 1901. Was made commander of the Legion of Honor, France, in 1900, and was also president of the Paris Society of American Painters and a member of the National Institute of Arts and Letters.

D'ANNUNZIO, GABRIELE (1864), Ital. poet, novelist, and dramatist, son of Duchessa Maria Gallese of Rome; his novels were placed on the *Index Expurgatorius* by the Vatican in 1911; his writings, which abound in sensuous imagery and color, include *Primo Vere*, 1880; *Il Piacere*, 1898 (Eng. *The Child of Pleasure*); *Le Vergini delle Rocce*, 1897 (Eng. *The Virgins of the Rocks*, 1899); *La Gioconda* (tragedy, 1899; Eng. 1901); *Francesca da Rimini* (five act tragedy, 1901; Eng. 1902): *Le Martyr de St. Sebastian* (mystery play, 1911): *Per la pui grande Italia*, 1915; *Notturno*, 1918; and *Tales of my Native Town* (Eng.) 1920. During World War spoke eloquently for Italy's intervention, and became national idol; proved himself a daring airman, and, among other feats, led an air flight to Vienna, Aug. 1918. After the armistice he carried out a dramatic coup by seizing Fiume, and though his action was disowned by the Ital. Government, popular feeling was strongly on his side. By treaty of Rapallo, Nov. 12, 1920, Fiume became an independent state. See FIUME.

DANTE ALIGHIERI (1265-1321), Ital. poet; *b.* Florence; *s.* of Alighieri, a notary of good family; D. is an abbreviation of *Durante.* Little is known of his early life, except that his first meeting with Beatrice occurred at the age of nine (1274), when she was of the same age, and that both his parents were dead by the time he was eighteen. Beatrice is believed to have been the dau. of Folco Portinari; she married Simone dei Bardi, and died in 1290. At the age of eighteen the poet began to write the noble lyrics inspired by his love for Beatrice, which he collected after her death and included in the *Vitra Nuova* (New Life). The death of Beatrice was followed by a period of bitter depression, which was succeeded by one of moral decline, and D. appears to have plunged into dissipation and found consolation in the gratification of an earthly passion. His delinquencies, however, were bitterly repented of, and followed by a noble atonement. A period of military service ensued. Somewhere about 1298 the poet married Gemma, dau. of Manetto Donati, by whom he had four children.

The government of Florence at this period was in the hands of the wealthy trade guilds. D. became a member of the Guild of Physicians, but the party to whom he belonged was overthrown by the nobles in 1301, and, in the following year, sentence of banishment was pronounced against him. During the period of his first exile (1302-10) D. wandered over Italy, spending much time at Verona, and commenced to write his *Convivio* (Banquet) and *De Vulgari Eloquentia.* Subsequently there seemed a prospect of the poet returning to his native Florence, but the terms offered were so humiliating that they were rejected, and a fresh sentence of banishment was pronounced. D.'s closing years were happily spent under the patronage of Can Grande della Scala at Verona, and that of Guido Novella (relative of Francesca of Rimini) at Ravenna. During this period his *Divina Commedia* was written, and other works continued. His death took place at Ravenna, the result of a fever, caused by a journey to Venice, and he was buried in the Franciscan convent there.

As the greatest poet which Italy has produced he was supreme as an epic poet, but also distinguished as a lyric writer as is shown in his *Canzoniere* and the lyrical portions of the *Vita Nuova*, while his minor writings, letters, etc., stamp him as one of the greatest intellectual forces the world has yet known.

DANTON, GEORGE JACQUES (1759-94), Fr. revolutionary leader who did most to bring about Reign of Terror under which he fell; became prominent as pres. of *Cordeliers* Club, extreme anti-monarchical and anti-aristocratic body; probably led march of people to

Tuileries; app. Minister of Justice, and afterwards became member of *Mountain* in Convention; condemned by Girondists for allowing massacre in prisons; member of Committee of Public Safety and voted execution of king; fanned rage of populace against Girondists; made Committee of Public Safety supreme and army efficient. 'Terror' now passed out of D.'s control. At first D. was protected by Robespierre, but he was subsequently abandoned, and guillotined with other 'moderates.'

DANUBE, or **DONAU,** second largest riv. of Europe and chief highway of commerce for Central Europe, drains about 315,360 sq. m.; total length, 1,725 m. Danube begins at Donaueschingen, Black Forest, at junction of Brege and Brigach (elevation, 2,264 ft.); course generally eastwards; N.E. and S.E. through Germany, S.E. through Austria, S.E. boundary for a short distance between Czecho-Slovakia on N., Austria and Hungary on S.; S. through Hungary, E. through N.E. of Jugo-Slavia, as boundary between Rumania and Bulgaria; N. through Rumania into Black Sea through vast delta, chief mouths being Kilia, Sulina, and St. George. Danube has innumerable tributaries, including Iller, Lech, Altmühl, Wönitz, Regen, Isar, Inn, Enns, Wien, Marsh, Leitha, Raab, Waag, Gran, Drave, Theiss, Save, Moravia, Schyl, Aluta, Isker, Sereth, Pruth. Chief towns on banks are Vienna, Budapest, Belgrade; also Ulm, Ratisbon, Passau, Linz, Pressburg, Waitzen, Orsova, Vidin, Nikopoli, Silistria, Braila. Danube is navigable from Ulm to Black Sea, and is open to all nations; shipping enters at Sulina mouth (greatly improved by European Commission of the Danube, instituted 1856); famous Iron Gates rapids long hindered navigation. Danube is connected with Rhine by Ludwigs Canal (1844), with Elbe by Moldau and Mühl canals. It has played a prominent rôle in history, commerce, and literature; has served as great national frontier since days of Roman Empire; Huns and Avars, Slavs and Magyars followed it westward; Carolingians, Bavarians, Crusaders, and Habsburgs followed it eastward. The scenery in Upper and Lower Austria is especially fine, with many historic and romantic buildings, fine mediæval and modern castles, churches, etc.

DANVERS, a town of Massachusetts, in Essex co. It is on the Boston and Maine Railroad, 5 miles N.W. of Salem. Until 1756 it was a part of Salem and embraced that portion where the witchcraft excitement broke out Danvers is the seat of the Peabody Institute, founded by George Peabody in 1852. He gave $200,000 for the promotion of knowledge and morality among the inhabitants of the town. It is also the seat of the Danvers Insane Asylum. It has important manufactures including the making of shoes, bricks, carpets, foundry products, rolling mill products, etc. Pop. 1920, 11,108.

DANVILLE, a city of Illinois, in Vermilion co., of which it is the county seat. It is on the Wabash, Chicago and Eastern, the Illinois, the Big Four, and the Chicago, Indiana and Southern railroads, and on the Vermilion River, 125 miles S. of Chicago. It is an important industrial city and is the center of an important coal mining region. It has also railroad car shops, iron foundries, carriage and wagon factories, and furniture factories. It is the seat of the National Soldiers' Home for Disabled Veterans. Pop. 1920, 33,776.

DANVILLE, a borough of Pennsylvania in Montour co., of which it is the county seat. It is on the Lackawanna, the Philadelphia and Reading and Pennsylvania railroads, and on the Montour River, 154 miles N.W. of Philadelphia. It is the center of a region rich in iron ore, limestone, and anthracite coal. Here was erected the first plant for the manufacture of railroad iron built in the United States, and it still ranks among the largest in the country. In addition there are blast furnaces, iron foundries, rolling mills, etc. It is the seat of a State Asylum for the Insane. Pop. 1920, 6,952.

DANVILLE, a city of Virginia, in Pittsylvania co., of which it is the county seat. It is on the Southern Railroad, and on the Dan River, 140 miles S.W. of Richmond. It has excellent water power from the river and has cotton mills, flour mills, grist mills, tobacco factories and foundries. It is the center of the famous yellow tobacco region of Virginia and over 30,000 pounds of leaf tobacco are marketed annually. It is the seat of the Randolph-Macon College, Roanoke Institute, and Danville School for Boys. Pop. 1920, 21,539.

DANZIG, FREE CITY OF, seaport, fortress, and naval station, W. Prussia (54° 20′ N., 18° 40′ E.), 3 m. from Baltic. Mottlau flows in two branches through the town; on left branch has older portion, Alstadt, Rechstadt, and Vorstadt; on its right, Speicherinsel. Before World War, Danzig was headquarters of 17th Army Corps, and maintained garrison of 6,000 men; trade more than doubled between 1884 and 1909, due to deepening of river, widening of Schuitenlake entrance, and creation of free port at Neufahrwasser; government shipbuilding yard and the large Schichau yard (4,000 hands); sugar refining; distilling, brewing, liquors (*Coldwasser*); iron and machine works, ordnance factories; tobacco, cigars, bricks, and cutting of amber. Imports coal, chemical products, herrings, petroleum, iron and earthenware. Exports wood, sugar, grain, flour, molasses, and oilcake. Nearly 2,300 vessels (tonnage, 346,400) entered port in 1913. Departures exceeded 1,970 tonnage, 600,900; many specimens of mediæval architecture; 14th cent. Rathhaus, rich carvings and paintings of scenes from local history on walls and ceilings. Chodowiecki, the 18th cent. painter, and Fahrenheit, the scientist, were natives. In 14th cent. fell into hands of Teutonic Knights; free city, under protection of Poland, 1466; on second partition of Poland, 1793, was taken by Prussia. In 1807 captured by French; at Peace of Tilsit again declared free, but with Fr. governor. In 1814 restored to Prussia. Ultimate destination of Danzig one of the most difficult problems before the Peace Conference of Paris in 1919. Geographically as well as historically claimed by Poland, but the question of nationality was arguable. Conference therefore decided that it should be a free city under the League of Nations, and its government is administered by a commission appointed by that body. Area, 710 sq. m. Pop. 1919, 352,000. See MAP GERMANY.

DAPHNÆ (*c.* 30° 54′ N., 32° 18′ E.), ancient town, on E. arm of Nile, Egypt; modern Defenneh.

DAPHNE (classical myth.), nymph beloved by Apollo; changed by her mother into a laurel tree.

DAPHNE, genus of European and temperate Asiatic shrubs of order Thymelæaceæ, mostly evergreen with fragrant flowers and, frequently, poisonous berries; cultivated in gardens.

DAPHNEPHORIA, festival celebrated at Thebes, every ninth year, in honor of Apollo.

DAPHNIS (classical myth.), Sicilian shepherd, punished with blindness for infidelity; reputed inventor of bucolic poetry.

DARAB (28° 42′ N., 54° 25′ E.), town, Farsistan, Persia; produces dates; antiquarian remains. Pop. 5,000.

DARBHANGA (26° 10′ N., 86° E.), district, Bihar and Orissa, India; consists of alluvial plain; exports rice and indigo; area, 3,348 sq. miles. Pop. 3,000,000. Chief town is Darbhanga, on Little Bághmati. Pop. 62,628.

D'ARBLAY, MADAME. See BURNEY, FANNY.

DARBOY, GEORGES (1813-71), Fr. ecclesiastic; upheld independence of Gallican Church; made abp. of Paris, 1863; killed at siege of Paris.

DARBY, a borough of Pennsylvania, in Delaware co. It is on the Baltimore and Ohio, and the Philadelphia, Baltimore and Washington railroads, and on the Darby River. Its industries include important manufactures of woollen goods, silk, cotton and worsted goods, tanks, tools, etc. Pop. 1920, 7,922.

DARCY, THOMAS (1467-1538), Lord D. of Templehurst, Yorks; Tudor warden of marches; summoned to Parliament as baron, 1509-38; executed for part in Pilgrimage of Grace.

DARDANUS (classical myth.), *s.* of Zeus and Electra; reputed founder of Trojan royal family.

DARDANELLES, or **STRAIT OF GALLIPOLI** (40° - 40° 25′ N., 26° 11′ - 26° 41′ E.), anc. *Hellespont*; long, narrow waterway connecting Ægean Sea with Sea of Marmora; length, 45 m.; width varies from 5 m. to less than 1 m.; on N.W. is peninsula of Gallipoli; on S.E. Asia Minor; entrance from Ægean Sea 2 m. wide; from this point Asiatic shore curves in crescent shape, while European shore is almost straight, to the 'Narrows' between Chanak (Asiatic side) and Kilid Bahr (European shore); navigation is dangerous; strong current, 3 to 4 m. an hour; vast strategic importance; fortified since 1460; at entrance, forts of Sedd-el-Bahr and Kum Kaleh. At Narrows, Kilid Bahr and Chanak. Not till 1774 were Dardanelles opened to Russian merchantmen. Brit. admiral, Sir J. T. Duckworth, forced straits in 1807; by treaty of 1841 (signed by Russia, Britain, Prussia, Austria and France) Turkey's right to keep Dardanelles closed to war vessels was made part of the public law of Europe. In 1854 British forces entered strait and landed at Gallipoli. In 1878 a British fleet under Admiral Hornby anchored before Constantinople ('The Russians shall not have Constantinople'). During Russo-Japanese War Russian warships passed through under commercial flag, but their operations were stopped by the Tsar. During World War Allies made unsuccessful attempt to force the straits. In class. legend, Leander swam across the Narrows (between Sestos and Abydos) to visit Leander. Byron imitated the exploit in 1810. Across the Narrows Xerxes threw his bridge of boats, 480 B.C., and Alexander the Great at same point led his troops across to Asia, 334 B.C. By the Treaty of Peace with Turkey, May 1920, the navigation of the Dardanelles, Sea of Marmora, and Bosporus was to be open in future both in peace and war to every vessel of commerce or of war, and to military and commercial aircraft without distinction of flag. No blockade or belligerent rights to be exercised in them without a decision of Council of League of Nations. A 'Commission of the Straits' was established, with control over these waters; it was to consist of representatives of the Powers in or hereafter to be in the League of Nations.

The regulation of the passage of vessels through the Straits formed one of the most important matters in controversy between Turkey and the other powers at the conference at Lausanne, in 1923. Russian influence was brought to bear to compel Turkey to insist upon a practical closing of the Straits during time of war, and strict regulations for the passage of war vessels in time of peace. The provisional treaty permitted any power to send three warships through the Straits in time of peace and a fleet as large as that of any Black Sea power in time of war.

Operations in the Dardanelles.—These operations were undertaken during the World War for the purpose of relieving the pressure on Russia, deterring Bulgaria from joining the Central Powers, and driving Turkey out of the war. Its inception, which is usually ascribed to Mr. Winston Churchill, was opposed by Lord Fisher, first sea lord of the Admiralty, who subsequently resigned on the question. It involved the successful reduction of forts by ships, an operation constantly decried by Nelson. It was erroneously supposed, on the analogy of Liége and Namur, that the enormous power of modern naval guns would completely overwhelm the forts. On Nov. 3, 1914, a Brit. and Fr. squadron shelled the outer forts in order to get the range, but the real attack was postponed until Feb. 19, 1915, when a squadron of obsolescent battleships, supported by *Queen Elizabeth*, *Agamemnon*, and *Inflexible*, opened fire on the forts at Cap Helle Kum Kale, and Sedd-el-Bahr. Intermittent attacks were continued, and by March 4 all these forts had been demolished, and the entrance to the straits had been swept by mine-sweepers. On March 6 the attempt to reduce the forts at the Narrows was begun. The hope was that once these forts were destroyed, the fleet would then sail up to Constantinople, seize *Goeben* and *Breslau*, and overawe the city. This ambitious proposal, however, was open to many strategic objections, which are set forth in the report of the Dardanelles Commission (see GALLIPOLI). On March 6 the super-Dreadnoughts shelled the forts at Chanak from the Gulf of Saros, while a squadron well up the straits also attacked them. Little progress, however, was made. On March 18 the super-Dreadnoughts were brought round to the entrance to the straits, and long-distance firing began. In the course of an hour and a half the Brit. fleet lost *Irresistible* and *Ocean*, with about 2,000 officers and men, while the French lost *Bouvet*. That evening the attack was abandoned. This attempt to force the straits without the assistance of an army proved to be a fatal mistake, as it gave the enemy warning of an impending landing, and afforded him the opportunity of fortifying the peninsula. See MAP NEW STATES, S. E. EUROPE.

DARES PHRYGIUS, reputed writer of a description of Trojan War, who lived before Homer.

DAR-ES-SALAAM ('harbor of peace'), seapt. and cap. of the former German E. Africa (6° 47′ S., 39° 15′ E.), 50 m. S. of Zanzibar. In 1887 Dr. Carl Peters occupied the bay in name of the German E. African Co., and established a factory. In 1901 the place became the official cap. of the colony, and was laid out in substantial style; starting-point of Central Ry. through Mrogoro and Tabora; overland telegraph via Ujiji with S. Africa; submarine cable with Zanzibar; harbor sheltered, floating dock; wireless (destroyed by British on outbreak of the World War). On Sept. 3, 1916, town heavily bombarded by British; evacuated by the Germans.

DARFUR, country of E. Sudan, Africa (crossed by 12° 30′ N., 24° E.), between Libyan desert, Wadai, Dar-Runga, Dar-Fertit, and Kordofan; a sandy steppe-like plateau; fertile valleys; wheat, cotton, sesame, and tobacco; cattle raising most important. Pop. 1,500,000, mainly negroid Furs, with Arabs, Fulbe, etc. In 1884 it fell to the Mahdi. Now in Anglo-Egyptian Sudan, but administered by its hereditary sultan. Cap. El Fasher.

DARGAI (34° 30′ N., 71° 52′ E.), hill station, N.W. Frontier Provinces, India; scene of stirring incident in Tirah campaign.

DARIAL (42° 43′ N., 44° 41′ E.), gorge, in Caucasus, E. of Mt. Kazbek, on Georgian military road; the chief pass across Caucasus.

DARIEN, ISTHMUS OF. See PANAMA.

DARIEN SCHEME (1695), a plan to colonize the Isthmus of Darien with Scotsmen. It was formed by William Paterson (founder of the Bank of Eng.). William III. opposed it. 1200 colonists landed at Darien; they were withstood by Spaniards and were short of provisions. Disease broke out, and only a small remnant returned to Scotland.

DARIUS, name of three Persian rulers. Darius I., *the Great* (*d.* 485 B.C.), seized throne, 521 B.C.; extended territories to Caucasus; great lawgiver and organizer; led immense expeditions to Greece in revenge for interference in Asia Minor; famous defeat of his general at *Marathon*, 490 B.C.—Darius II. (*Ochus*) ruled 423-404 B.C.; made alliance with Sparta against Athens.—Darius III. (*Codomannus*), beaten at *Issus* and *Arbela* (331) by Alexander the Great.

DARJEELING, DARJILING (27° 3′ N., 88° 18′ E.), district, Bengal, India, on Himalayas; partly mountain and valley; well cultivated; magnificent scenery; area, 1,164 sq. miles. Pop. 249,117. Capital is Darjeeling, elevation over 7,000 ft., chief health station in Bengal; tea-planting. Pop. 13,000.

DARLEY, FELIX OCTAVIUS CARR (1822-1888), American artist. Born in Philadelphia. He was self-taught in art. He illustrated Cooper, Irving, Longfellow, Hawthorne, Shakespeare and Dickens; also Lossing's *History of the United States*. His lithographs made for Irving's *Sleepy Hollow* and *Rip Van Winkle* are still prized. A trip to Europe resulted in *Sketches with Pen and Pencil*, 1868. He also painted in water-color, scenes from American history.

DARLING (34° 30′ S., 142° E.), river, Australia; rises in Queensland; flows through N. S. Wales; joins the Murray.

DARLING, GRACE HORSLEY (1815-42), Eng. heroine; *dau.* of William D., keeper of Longstone lighthouse (Farne Islands); famous for share in rescue of shipwrecked crew of *Fortfarshire*, 1838.

DARLING, SAMUEL TAYLOR (1872), *b.* in Harrison, N.Y. Graduated from College of Physicians and Surgeons at Baltimore, Md., in 1903. Was chief of Lab., Panama Canal from 1906 to 1915 and was with General Gorgas on sanitary mission to Rand mines and Rhodesia, South Africa, during 1913-14. Also was chairman of board under Rockefeller Foundation to investigate causes of anemia among people of Malaya, Java and Fiji, 1915-17, and was professor of hygiene and director of laboratories of hygiene at Faculdade de Medicina e Cirurgia de Sao Paulo, Brazil, from 1917-20. Made president of Canal Zone Medical Association in 1908. Published researches on malaria, dysentery, hookworm infection, trypanosomiasis and other tropical infections.

DARLINGTON (54° 32′ N., 1° 34′ W.), market town, Durham, England, on Skerne, near junction with Tees; has ancient Gothic church (1160), Edward Pease Library (1885), technical coll., grammar school; woolen manufactures, iron and steel works; Stockton and Darlington Railway (opened Sept. 27, 1825) was the first passenger line on which locomotives were used. Stephenson's Locomotive No. 1 is preserved at Bank Top Station. Pop. 1921, 65,866.

DARLINGTON, JAMES HENRY (1856), Protestant Episcopal Bishop. Born in Brooklyn, N.Y. Graduated from New York University, 1880; Princeton Theological Seminary, 1884. Rector of Christ's Church, Brooklyn, N.Y.; consecrated first Bishop of Harrisburg, April 1895. Lecturer to New York University, 1902-1903. Chaplain of Masonic Grand Lodge of Pa. 1910. Lieutenant-colonel on staff of governor of Pennsylvania; member of Committee of Public Safety 1910-1915. Head of Serbian Relief Fund in U.S. Decorated by France, Greece and Belgium for public services. Founder of the Russian Club in America. Chairman of Commission from Episcopal Church of America to confer with Eastern Orthodox Churches and Old Catholics, visiting Constantinople, Athens, etc. in 1920, and making a concordat. Edited *Hymnal of the Church*, *Little Rhymes for Little People*. Author *Pastor and People*, etc.

DARLINGTON, THOMAS (1858), an American physician, *b.* at Brooklyn, N.Y., *s.* of Thomas and Hannah Anne Goodliffe Darlington. He was educated at New York University and at Columbia. After studying medicine at the latter institution he began practicing at Newark, N.J. in 1880 and later in New York City. In 1888 he removed to Bisbee, Ariz., but returned to New York in 1891 and thereafter held many important positions there including president of New York Board of Health, and consulting physician at New York Foundling, French and Fordham hospitals. In 1917 he was major in the Medical Reserve Corps.

DARLINGTONIA CALIFORNICA, pitcher plant of the order Sarraceniaceæ, native on Sierra Nevadas, California. The bright-colored leaves are twisted to form an insect trap (pitcher), the prey being digested and absorbed by the leaf.

DARMSTADT (49° 52′ N., 8° 38′, E.), town, on Darm, Hesse, Germany; residence of grand-duke and seat of government of former duchy of Hesse-Darmstadt; has several fine squares and churches; chief edifice—ducal palace (containing large library and works of art); chemicals, machinery. Pop. 82,300.

DARNLEY, HENRY STEWART, LORD (1545-67), Scot. noble; great-grandson of Henry VII.; *s.* of Earl of Lennox; Earl of Ross and Duke of Albany, 1565; *m.* Mary, Queen of Scots, in 1565, being proclaimed king on previous day; father of James VI. of Scotland, I. of England; assisted in murder of Rizzio. D. was murdered at Kirk o' Field, a house on the site where Edin Univ. now stands; Bothwell was tried for the murder, but was not convicted.

DARRANG (26° 30′ N., 92° E.). district, Assam, India; mostly level; watered by Brahmaputra and tributaries; tea and rice. Area, 3,418 sq. miles. Pop. 337,000.

DARROW, CLARENCE S. (1857), lawyer; *b.* at Kinsman, Ohio. Educated at the public schools, he was admitted to the bar in 1875. He won prominence in fighting monopolies such as the Gas Trust, Chicago. He appeared for the coal miners during the strikes of 1902-3. Was counsel for Debs and labor interests in other cases, and a member of the Illinois Legislature in 1902. In 1911 he was counsel for the McNamara brothers in the Los Angeles Times dynamite case. He was tried and acquitted in 1912 on the charge of having attempted to bribe a juror. He defended Moyer, Haywood and Pettibone charged with the murder of ex-Governor Steunnenberg of Idaho. He is the author of many pamphlets on social and economic questions.

DARTFORD (51° 27′ N., 0° 12′ E.), market town, Kent, England; Wat Taylor's rebellion commenced here, 1381; paper-mills. Pop. 24,000.

DARTIGE DU FOURNET (1856), Fr. admiral with a long and brilliant career; commander of the port of Bizerta at outbreak of World War; in charge of detached squadron operating off coast of Syria, Jan. 1915; took over command of Fr. Dardanelles squadron in Allied operations in Gallipoli, Sept.; succeeded Admiral Boué de Lapeyrère as commander-in-chief of Fr. navy, Oct.; during crisis in Greece presented Allied remonstrance to King Constantine; successfully evacuated remnants of Serbian Army which had retreated across Albania. He pub. *Souvenirs de Guerre d'un Amiral, 1914-16* (1920).

DARTMOOR (50° 35′ N., 4° W.), granitic plateau, S.W. Devonshire, Eng.; mean elevation, 1,500 ft.; rich in minerals and antiquities; seat of convict prison.

DARTMOUTH, a city in Massachusetts, in Bristol co., on the Paskamansett River. It is the center of an important poultry raising and dairying region and it has important manufactures of box board. Its public institutions include three public libraries. The surrounding country is a favorite summer resort. Pop. 1920, 6,493.

DARTMOUTH (50° 22′ N., 3° 34′ W.), seaport, market town, Devonshire, England, near mouth of Dart; has spacious harbor; Royal Naval College; number of quaint houses of Elizabethan architecture, and remains of ancient castle; is yachting center and coaling-station; boat-building. D. was burnt by the French in reigns of Richard I. and Henry IV.; besieged and captured by Prince Maurice in the Civil War, 1643, retaken by Fairfax, 1646.

DARTMOUTH (44° 40′ N., 63° 34′ W.), town, Nova Scotia, Canada; iron foundries. Pop. 5,000.

DARTMOUTH COLLEGE, a seat of higher learning for men, situated at Hanover, N.H. It had its origin in a school for the education of Indian children, founded by the Rev. Eleazar Wheelock in 1754, in Lebanon, Conn. The school was known as Moor's Indian Charity School after a farmer who provided the house and land. Funds for the school's maintenance were provided by the general courts of Massachusetts and New Hampshire. Financial aid also came from England, where a sum of $50,000 was subscribed, one of the chief contributors being the Earl of Dartmouth, who headed a board of trustees which was organized. The school was removed to Hanover, where the State of New Hampshire gave the establishment grants of 44,000 acres of land. There the institution was chartered as Dartmouth College in 1769, and Dr. Wheelock was made its first president. The college in 1819 was the means of inspiring a famous judgment of the U.S. Supreme Court bearing on corporation law, the case arising from a dispute between the college trustees and the State of New Hampshire. The latter sought, by revising the college charter to increase its representation on the board of trustees, but the old trustees challenged the State's right to change the charter. Daniel Webster argued their case before the Supreme Court, which sustained his view that a charter was a contract and that the legislature violated the federal constitution in attempting to impair it.

Dartmouth College of today embraces the original Moor School as an academical or preparatory department, the Amos Tuck School of Administration and Finance, the Thayer School of Civil Engineering, the Medical School, the Chandler School of Science, and a summer school. The Amos Tuck School was founded by an endowment fund of $300,000 donated in 1900 by Edward Tuck, an alumnus, in memory of his father, also a former student. The library contains more than 125,000 volumes and pamphlets. In 1922 the endowment fund amounted to $6,000,000; the student roll numbered 2,011, and there was a teaching staff of 160 under the presidency of Dr. E. M. Hopkins.

DARU, PIERRE ANTOINE NOEL BRUNO, COUNT (1767-1829), Fr. soldier, author, and statesman; able commissionary to Napoleon's armies; Sec. of State, 1811; Minister of War, 1813.

DARWEN (53° 45′ N., 2° 28′ W.), manufacturing town, Lancashire, Eng.; cotton-mills. Pop. 1921, 37,913.

DARWIN, CHARLES ROBERT (1809-82), Eng. naturalist; son of Dr. Robert Waring Darwin, and grandson of Dr. Erasmus Darwin. After schooldays in his native town, Shrewsbury, he went to Edinburgh in 1825 to study medicine. This proved to be uncongenial, so he entered Christ's Coll., Cambridge, in 1828, with the intention of becoming a clergyman, and graduated three years later. However, his scientific proclivities, which had already been apparent in Edinburgh, received much encouragement from Prof. J. E. Henslow, botanist, and Prof. Adam Sedgwick, geologist, and through the former he secured the position of naturalist for the survey expedition of H.M.S. *Beagle* under Captain Fitzroy. On this celebrated voyage, visiting Cape Verde and other Atlantic islands, S. America, Pacific Islands, Australia, Tasmania, and various islands in the Indian Ocean and S. Africa, Darwin made observations and collected material which laid the foundation for his subsequent work. On his return to England he was for several years occupied in preparing reports of the scientific results of the voyage of which the most noted are: *Journal of a Naturalist*, 1839; *Structure and Distribution of Coral Reefs*, 1842; *Geological Observations*, 1844 and 1846.

After marrying his cousin, Miss Wedgwood, he settled permanently in a country house at Down, in Kent, where, owing to his favorable pecuniary circumstances, he was enabled, in spite of persistent ill-health, to pursue indefatigably the researches which led to the enunciation of one of the most far-reaching theories in human history. He became more and more convinced, especially after reading Malthus *On Population*, that species were not immutable. After discussing the problem with Asa Gray and his friends Lyell and Hooker, he prepared the essay, *On the Tendency of Species to Form Varieties, etc.*, which, together with an essay by A. R. Wallace, who had independently arrived at the same conclusions, was read at a memorable meeting of the Linnean Society in 1858. This communication, followed by the publication, in the following year, of *On the Origin of Species by Means of Natural Selection, or the Preservation of Favored Races in the Struggle for Life*, aroused wild enthusiasm, and at the same time bitter opposition, and has inspired research in every branch of science, including that of human conduct. *The Variation of Animals and Plants under Domestication*, 1868; and *The Descent of Man, and Selection in Relation to Sex*, 1871, were other proofs of the vast amount of material Darwin had collected. He published various works on the fertilization of plants and their movement, subjects which fascinated him greatly, and on *The Formation of Vegetable Mould through the Action of Worms*, 1881. See EVOLUTION.

DARWIN, SIR FRANCIS (1848), Eng. botanist and biographer, son of Charles Darwin; F.R.S.; president of British Association, 1908. Has written *Life and Letters of Charles Darwin*, 1887.

DARWIN, SIR GEORGE HOWARD (1845), Eng. astronomer; second son of Charles Darwin; Plumerian prof. at Cambridge, 1883; president British Association, 1905.

DARWINISM. See EVOLUTION.

DATIA (25° 40′ N., 78° 30′ E.), native state, Central India. Area, 912 sq. miles. Pop. 154,600. Chief town, Datia, is walled and has several palaces. Pop. 25,000.

DATE. See CHRONOLOGY.

DATE. The D. palm, or *Phoenix dactylifera*, is a tree of the natural order Palmæ, cultivated chiefly in warm countries for its fruit. The stem is generally 20 to 30 ft. high, and is crowned at the top by leaves which often split and become pinnate. The inflorescence is enveloped in a large spathe when young. The diœcious flowers are in clusters. The fruit contains a stone which cases the embryo in a mass of hard endosperm. The male and female flowers are borne on separate trees, and as it is impossible to distinguish them before the flowers appear they have to be artificially fertilized. No difficulty is found in the cultivation of the D. palm, plenty of sun, light, and sandy rather than rich soil, and a certain amount of water, are the only conditions required. They commence to bear fruit at eight years old and continue to do so for more than a century. The D. is a very important article of food in Arabia, where other foods are hard to obtain. It is eaten raw, roasted, or ground, and pressed into cakes. The leaves are used for matting, and the wood for any kind of carpentry in which a light species only is required; the stem-fibre is made into ropes. It is largely exported. It is mentioned in the earliest records of the Assyrians and Greeks, and the Jews also used it as a symbol of victory.

DATE PLUM, a name given to several species of *Diospyros* in the order Ebenaceæ. *D. lotus*, the common D.P., or European lotus, has long shining leaves, white flowers tinged with pink, and fruit almost like a cherry. It is really a tropical tree, but has been naturalized and is cultivated in the S. of England where the fruit is used for preserves. *D. Kaki* is the Chinese D.P., or persimmon.

DATOLITE ($Ca(BOH)SiO_4$), mineral occurring in colorless or greenish white monoclinic crystals in cavities of basic ingeneous rocks.

DAUBENTON, LOUIS JEAN MARIE (1716-99), Fr. naturalist; assisted Buffon by writing the anatomical part of the *Histoire naturelle*; prof. of Mineralogy at the Jardin du Roi; prof. of Nat. History at the Coll. of Med.; author of numerous research papers.

DAUBENY, CHARLES GILES BRIDLE (1795-1867), Eng. scientist; prof. of Chem. 1822 and of Bot. 1834 at Oxford; investigated thermal waters in U.S.; pres. Brit. Association, 1856.

DAUBREE, GABRIEL AUGUSTE (1814-96), Fr. geologist; prof. of Mineralogy and Geol. at Strassburg; known for his experiments in the artificial production of rocks.

DAUDET, ALPHONSE (1840-97), Fr. novelist; *b.* Nîmes; served as usher (vide *Le Petit Chose*); took to journalism, and experienced hard struggles; he achieved fame with *Fromont Jeune et Risler Aine*, *Jack Numa Roumestan*, *Sapho*, the brilliant, humorous *Tartarin* stories, *Lettres de mon Moulin*, and *Contes du Lundi*; noted as a stylist; his play, *L'Arlesienne*, with Bizet's music is still a favorite; one of the greatest Fr. novelists of the later 19th cent.

DAUDÉT, LEON (1868), Fr. man of letters and Royalist agitator, *s.* of Alphonse Daudet; ed. of L'Action Française; most popular work is *Les Morticoles*, 1894, a satire on physicians.

DAUBIGNY, CHARLES FRANÇOIS (1817-1878), French painter. Born at Paris. Studied with father and Delaroche and exhibited regularly in the Salon, but did not obtain full recognition until middle-age. He worked in a houseboat much of the time, and lived close to nature. Principal works, *Springtime*, 1861; *Banks of the Oise*, 1872; *Rising Moon*, 1877. *Vintage* is in the Luxembourg Gallery, and many of his paintings are in America. He was also a book illustrator and etcher. See Van Dyke's MODERN FRENCH MASTERS.

DAUGHERTY, HARRY MICAJAH (1860), Attorney General of the United States, *b.* at Washington Court House, Ohio, January 26, 1860. He studied at the public schools of his birthplace and in 1881 graduated from the University of Michigan, with the degree of LL.B. Admitted to the bar of Ohio he first practiced at Washington Court House, removing to Columbus, Ohio, in 1893. He served two terms in the Ohio Legislature, 1890-1904. President Harding appointed him Attorney General of the United States on March 4, 1921. On December 1, 1922, Representative Keller (Rep., Mont.) submitted to the House fourteen allegations in support of his resolution for the impeachment of the Attorney General who was accused among other things of favoritism, failure to proceed against monopolies, etc. An investigation which followed failed to prove the charges, 1923.

DAUGHTERS OF THE AMERICAN REVOLUTION, a patriotic organization of women descended from colonists who took part in the War of Independence, either as citizens, soldiers, sailors or as civil officers. It was founded in 1890 with the aim of perpetuating the memory of the Revolutionary patriots, promoting a general diffusion of knowledge, and preserving and extending institutions of American freedom. Its headquarters are in Washington, D. C., and it reports annually to Congress in accordance with the act incorporating the society. It has about 1,460 local chapters comprising a membership of about 116,000, delegates of whom meet annually in Washington. The society has collected many historical relics, as well as a genealogical library, and publishes records of the lineage of each member.

DAUGHTERS OF THE CONFEDERACY. See CONFEDERACY, DAUGHTERS OF.

DAULATABAD (19° 57′ N., 75° 15′ E.), decayed city, the ancient Deogiri, Hyderabad state, India; on isolated rock 600 ft. high; celebrated fortress; taken by Mohammedans, 1294.

DAUN, LEOPOLD JOSEF, COUNT VON (1705-66), Austrian general; inflicted first defeat suffered by Frederick the Great, at Kolin, 1757, and was principal deterrent to Prussia during Seven Years War; prince of Thiano.

DAUPHIN.—Title of lords of Vienne who were called 'Dalphinus', (Delphinus) in XII. and XIII. cent's. When Dauphiné came to Fr. crown, 1349, title of Dauphin was bestowed on king's eldest son; crest contained a dolphin (*dauphin*).

DAUPHINÉ (44° 50′ N., 6° E.), ancient province, S.E. France; capital, Grenoble; formed part of kingdom of Burgundy; now comprised in departments of Drôme, Isère, and Hautes-Alpes.

DAVENANT, SIR WILLIAM (1606-68), Eng. poet and dramatist; *b.* and ed. Oxford; served as court page; wrote for the stage; fought on royal side in Civil War; suffered imprisonment, and is said to have been released through Milton's influence; wrote *Gondibert*, an epic poem; numerous plays, including *Siege of Rhodes*, a precursor of opera; and adaptations, (*e.g.*) *The Tempest*, with Dryden.

DAVENPORT, a city of Iowa, in Scott co., of which it is the county seat. It is on the Chicago, Milwaukee and St. Paul, the Burlington and Northern, and other railroads, and on the Mississippi river and Hennepin canal, 183 miles southwest of Chicago. The river is spanned here by a bridge built by the United States government at a cost of over $1,000,000. It connects Davenport with Rock Island, Ill. The city is one of the great grain depots of the upper Mississippi region. It is in the heart of important bituminous coal fields and is a manufacturing center. Its industries include the making of carpets, locomotives, steel cars, carriages, agricultural implements, lumber, and foundry and machine shop products. There is connection by passenger and freight steamers with all the important lake ports. The city is well laid out and attractive. Among the notable buildings are the county buildings and the city hall. The educational and other institutions include the Iowa Orphans' Home, Academy of Natural Science, Immaculate Conception Academy, Griswold College and St. Catherine's Hall. Pop. 1920, 56,727.

DAVENPORT, CHARLES BENEDICT (1866), an American biologist, *b.* at Stamford, Conn., *s.* of Amzi B. and Jane Joralemon Dimon Davenport. He was educated at Poly. Inst. Brooklyn, and at Harvard University. He was at first assistant then instructor in zoölogy at the latter institution from 1888-99, later associate professor and curator of the Zoological Museum of the University of Chicago and in 1904 became director of the Station for Experimental Evolution, Carnegie Institution, Cold Spring Harbor, New York, where he later organized and directed the Eugenics Record office. During 1918-19 he was major, Sanitary Corps, U.S.A. He was associate editor of several eugenic and zoöl. periodicals and in addition to contributing to biological journals was the author of numerous books on biology, zoölogy and eugenics.

DAVENPORT, EDWARD LOOMIS (1814-1877), American actor, *b.* in Boston, November 15, 1814; *d.* at Canton, Pa., September 1, 1877. His first stage appearance was at Providence, Rhode Island in *Sir Giles Overeach* in support of Junius Brutus Booth, who played the role of Sir Giles. Mr. Davenport soon became famous playing with distinction in comedy, tragedy, and melodrama. He supported Mrs. Mowatt (Ritchie) in many plays and accompanied her to England in 1847. For two seasons he supported W. C. Macready, returning to America in 1854 when he toured the country in Shakesperean plays and adaptations from Dickens. He was especially noted as *Hamlet, Brutus, Sir Giles Overeach* and *Bill Sykes*. He managed the Howard Atheneum, Boston, in 1859, and the Chestnut Street Opera House, Philadelphia, in 1869. See MOSES, MONTROSE J. 'FAMOUS ACTOR FAMILIES OF AMERICA.'

DAVENPORT, FANNY LILY GIPSY (1850-1898), an American actress; *b.* in London, England, *d.* at Duxbury, Mass. Her first stage appearance was made at the Howard Atheneum, Boston, then under the management of her *f.*, E. L. Davenport, in 1857. She joined Augustin Daly's Fifth Avenue Theatre Company in 1869 and was soon playing leading parts. She afterwards toured the country as a star in Daly's *Pique*, *London Assurance* and *Nancy Sykes*, but her most notable triumphs were in plays by Sardou, especially in *Fedora* and *La Tosca*. She *m.* Edwin H Price in 1879 whom she subsequently divorced, and married Melbourne McDowell, the leading man in her company. She produced *A Soldier in France* in 1897 in which she acted the part of *Joan of Arc*, and the failure of the play is said to have hastened her last illness. Her last appearance on the stage was at the Grand Opera House, Chicago, on March 25, 1898. See MOSES, MONTROSE J. 'FAMOUS ACTOR FAMILIES OF AMERICA.'

DAVENPORT, HOMER CALVIN (1867-1912), American cartoonist; *b.* at Silverton, Oregon, 1867. He had a varied career as jockey, clown, and printer's devil, and was entirely self-taught in art. Engaged as cartoonist for the San Francisco Chronicle in 1895, he was next engaged by Mr. W. R. Hearst for the New York Journal, in which his famous cartoons of Mark Hanna and Mr. McKinley appeared. Interest in Arabian horses caused him to visit Arabia in 1906. He was the only artist ever permitted to draw the Sultan of Turkey. Author: *Belle of Silverton*, *Dollars or Men?* and *Diary of a Country Boy*.

DAVEY, RANDALL (1887), an American artist, *b.* at East Orange, N. J., *s.* of Vernon L. and Mary Shepherd Randall Davey. He was educated at Cornell University, from which he received the degree of B.Arch. in 1900, and studied art in New York City with Robert Henri and also in France, Spain and Holland. He was awarded the 2nd Hallgarten Prize by the National Academy of Design and in addition to his paintings in private collections, his *Portrait of a Young Lady* and *Flowers* are among the permanent collection of the Art Institute of Chicago, and his *Portrait of an Old Sea Captain* is in the Corcoran Art Gallery at Washington, D. C.

DAVID (Hebrew, 'Beloved'), Hebrew king whose career is recounted in Books of Samuel, Kings, and Chronicles. Books of Samuel are earliest in date, but are themselves evidently compiled from earlier and often incompatible histories; Chronicles, much later, remodels story to suit in accordance with the changed ideals of a later age. D. was *s.* of Jesse of Bethlehem in Judah; kept his *f.'s* sheep and practiced music until called to cure the madness of King Saul by means of his harp; became a royal favorite and formed the classical friendship with king's *s.*, Jonathan. The growing jealousy of Saul resulted in D.'s exile, and his final refuge in the cave of Adullam with kinsmen and partisans; here he was visited by Jonathan. From Adullam D. led attacks on Philistines; on Saul's being slain by an Amalekite, D. persuaded the inhabitants of Judah to accept him as king. Jersusalem, captured from Jebusites was fortified as 'City of D.,' and received 'Ark of Covenant,' for the shelter of which a tent was pitched, the building of temple being reserved by command of prophet Nathan for Solomon; census of people was taken, an act punished by plague; D.'s defeat of Ammonites and Moabites secured his country from external warfare. Retribution to house of Saul for slaughter of Gideonites was carried out by Jehovah's command. Further events of D.'s reign were his sin in the abduction of Bathsheba, wife of Uriah the Hittite; murder of his *s.* Amnon by his half-bro., D.'s *s.* Absalom; revolt of Absalom and Ahithophel, which drove D. from Jerusalem (he was reinstated by Gileadites). Modern critics disallow his claim to be compiler of the Book of Psalms; many of psalms were written by him but some later than his epoch. His reign marks culmination of Jewish national prosperity; most famous king of Israel, unifier of nation and founder of capital; prophets foretold birth of Messiah from D.'s line. Bible account is of great hist. and literary importance.

DAVID I. (1084-1153), king of Scots; *s.* of Malcolm Canmore and 'St.' Margaret; introduced Norman feudalism into Scotland.

DAVID II. (1324-71), king of Scotland, 1329; *s.* of Robert Bruce; taken prisoner by England at Neville's Cross, 1346.

DAVID I. OF WALES (*d.* 1203), lord of district round Snowdon; called by one chronicler 'king'.—David II. (*c.* 1208-46), prince of N. Wales; forced to do homage to Henry III.— David III. (*d.* 1283), patriot, executed by Edward I.

DAVID, ST., DEWI (*c.* VI. cent.), Welsh patron saint; canonized XIII. cent.; festival, March 1.

DAVID, FÉLICIEN (1810-76), Fr. composer; achieved fame with *Le Desert*, a symphonic ode, 1844.

DAVID, PIERRE JEAN, DAVID D'ANGERS (1789-1856), Fr. sculptor; *b.* Angers; executed pediment of Panthéon, Paris.

DAVIDSON, GEORGE (1825-1911), American astronomer; *b.* in Nottingham, Eng., 1825; he came to the U.S. in 1832;

was with the Coast and Geodetic Survey, 1845-1895, and won fame for astronomical research. He took observations in all countries, especially of the transit of Venus. Author: *The Alaska Boundary*, 1903; *Glaciers of Alaska*, 1904; *Francis Drake*, 1908; *Origin and Meaning of Name California*, 1910. Was professor of Geology, University of California.

DAVIDSON, JOHN (1857-1909), Scot. poet, dramatist and novelist; won distinction with *Fleet Street Eclogues*, 1893, and other vols. of verse.

DAVIDSON, RANDALL THOMAS (1848). Archbishop of Canterbury and Primate of all England, 1903; Bishop of Rochester, 1891-5, and of Winchester, 1895-1903; was deeply interested in Church and social reform; organized a national Mission of Repentance and Hope during the World War, 1916.

DAVIDSON, WILLIAM JOSEPH (1869), an American theological professor, *b.* at Warsaw, Ill., *s.* of William Henry and Hannah West Davidson. He was educated at Chaddock College, Illinois Wesleyan University and Garrett Biblical Institute and later took a special course in mathematics at Cornell and philosophy at Boston University. He was ordained a M.E. minister in 1896 and after being pastor at Roodhouse, Ill., and later at Greenfield, Ill., he became a teacher in Greek and Hebrew at Garrett Biblical Institute in 1900. Two years later he became pastor of 1st Church, Decatur, Ill., in 1908 he was made chancellor of Nebraska Wesleyan University and in 1910 again became connected with the Garrett Biblical Institute, where for two years he was professor of sacred rhetoric and then until 1920 professor of religious education. In 1921 he became executive secretary of the Commission of Life Service of the M.E. Church.

DAVIES, ARTHUR B. (1862), American painter; *b.* Utica, N. Y. He studied at art schools in Chicago and New York and did his first work as an illustrator for the St. Nicholas magazine. He belonged to the Romantic School in painting and has executed notable works, many of which are in the Metropolitan Museum of Art, N. Y., and the Chicago Art Institute. Among them may be cited *Spring's Renewal*, 1901; *The Girdle of Ares*, 1908; *Visions of the Sea*, 1911; *Maya, Mirror of Illusions*, now in the Chicago Art Institute. His later tendencies have been toward the Cubist School of Art. His best known example in that style is *The Great Mother*, 1914. He has exhibited at many expositions at home and abroad.

DAVIES, BEN (1858), Welsh tenor singer; studied at Royal Academy of Music; joined Carl Rosa Opera Co. in 1882. Since 1900 has confined himself to concert platform and to musical festivals; has toured in U.S. and Australia.

DAVIES, SIR JOHN (1569-1626), Eng. poet; author of *Orchestra*, poem in praise of dancing, *Nosce Teipsum*, philosophical poem, *Hymn to Astroea*, etc.

DAVIES, SIR LOUIS HENRY (1845), Canadian jurist and politician; judge of Supreme Court of Appeals, Canada; delegate to Washington on the Bering Seal seal question, 1897; also commissioner to U.S. for settlement of differences between U.S. and Canada, 1898.

DAVIES, RANDALL ROBERT HENRY (1866), English art critic and lawyer. He received his education at Bradford and Scoones Schools. For several years he was art critic for the Westminster Gazette, the New Statesman and other papers. He studied for the bar and became a solicitor in 1908. For a considerable period he was the confidential secretary of Joseph Pulitzer, proprietor of the New York World. Besides many monographs on the work of famous painters he has written *Stories of the English Artists*, 1908; *A Lyttel Book of Nonsense*, 1912; and *Six Centuries of Painting*, 1914. He also edited Black's Dictionary of Pictures, 1922 .

DAVIESS, MARIA THOMPSON, an American authoress and artist, *b.* at Harrodsburg, Ky.; daughter of John Burton Thompson and Leonora Hamilton Daviess. After graduating from Science Hill, at Shelbyville, Ky., in 1891, she took a special literary course at Wellesley and later studied painting in various schools in Paris. She at first was a miniature painter and art jewelry worker and in 1904-5 exhibited in the Paris Salon. She afterwards began writing and in addition to short stories for leading magazines she was the author of: *Miss Selina Sue and the Soap Box Babies*, 1909; *The Road to Providence*, 1910; *Rose of Old Harpeth*, also *The Treasure Babies*, 1911; *The Melting of Molly*, 1912 (dramatized); *The Tinder Box*, 1913; *Over Paradise Ridge*, 1915; *The Daredevil*, 1916 (dramatized); *The Heart's Kingdom*, 1917; *The Golden Bird*, 1918; *Bluegrass and Broadway*, 1919; and *The Matrix* in 1920.

DAVIS, ARTHUR KYLE (1867), a college president, *b.* at Petersburg, Va., *s.* of William Thomas and Caroline Robinson Davis. He was educated at Randolph-Macon College, at Ashland, Va., from which he received the degree of A.B., in 1887, and A.M., in 1888, and became president of Southern College (Junior), at Petersburg, in 1889. He founded the Shakespeare Club where he was a lecturer for two years and was the author of several books among which are *Three Centuries of an Old Virginia Town*; *Education in Virginia*; *Virginia and the Methodists*, and *Virginia's War History*.

DAVIS, BOOTHE CALDWELL (1863), an American university president, *b.* near Jane Lew, Lewis co., West Virginia, *s.* of Samuel D. and Elizabeth FitzRandolph Davis. He graduated in 1890 from Alfred University where he later received a D.D., 1901, and an LL.D., 1915, and also held the degree of B.D., Yale, and Ph.D., National Normal University. He was ordained in the Seventh-Day Baptist ministry in 1893 and was pastor at Alfred, N. Y., from then until 1895 when he retired from the ministry to become president of Alfred University. He was also made president of the New York State School of Clay Working and Ceramics in 1900, and president of the New York State School of Agriculture, at Alfred University in 1908.

DAVIS, CHARLES HENRY (1865), American civil engineer; *b.* Montgomery co., Pa. He graduated at Columbia University in 1877. He was connected with the Thompson-Houston Electric Company, 1887; with the Sawyer-Man Electric Company of New York, 1887-88, and was engineer and superintendent of construction with the Westinghouse Electric Company, 1888-9. Since the latter date he has been a consulting engineer with offices in Philadelphia, Boston and New York, and has also served as trustee of various estates.

DAVIS, CHARLES HENRY (1845-1921), American naval officer; *b.* Cambridge, Mass. He graduated from the U.S. naval academy in 1864, entered the service as ensign in 1866, and rose through various grades until he became rear admiral in 1904. During the Spanish-American War he served with the Atlantic Squadron. Much of his professional work was connected with matters of scientific importance to the navy. In 1907 he retired by operation of law. His publications include *Chronometer Rates as Affected by Temperature and Other Causes*; *Telegraphic Determination of Longitude* and *The Life of Rear Admiral Davis*, 1899.

DAVIS, CUSHMAN KELLOGG (1838-1900), American legislator; *b.* Henderson, N. Y. He graduated from the University of Michigan in 1857, and was admitted to the bar in the same year. At the outbreak of the war he enlisted in the Union army, resuming the practice of law in St. Paul in 1865; two years later he was chosen a member of the Minnesota Legislature. He became U.S. district attorney in 1868 and Republican governor of Minnesota in 1874. In 1887 he was elected U.S. Senator and held that office for three successive terms. He served on many important committees in that body, and was for several years chairman of the Senate committee on foreign relations. Following the war with Spain he was a member of the committee that negotiated the peace treaty between that country and the United States. He published *The Law in Shakespeare*, 1900.

DAVIS, DAVID (1815-1886), American jurist and legislator; *b.* Cecil co., Md. He graduated from Kenyon College in 1832 and entered on the practice of law in Illinois in 1835. In 1844 he was elected to the Illinois State legislature and was State circuit judge from 1848 to 1862, in the latter year becoming an associate justice of the Supreme Court of the United States. He resigned his judgeship in 1877 to enter the U.S. Senate, retiring at the expiration of his term in 1883.

DAVIS, GEORGE SAMLER (1858), an American college president, *b.* at New York City, *s.* of Robert Vernon and Mary Samler Davis. He was educated at the College of the City of New York and received an LL.D. from New York University in 1908. After teaching in New York public schools for seven years he was made assistant supt. of schools there in 1887 and was associate city supt. from 1896 to 1908 when he became president of Hunter College, City of New York.

DAVIS, HENRY WINTER (1817-65), Amer. statesman and lawyer; did much to keep Baltimore faithful to Union; urged Maryland to emancipate slaves and advocated votes for negroes.

DAVIS, JAMES (1852), an American bishop; *b.* in Tinvawn, Ireland; *s.* of James and Margaret Davis. After receiving his education under Carmelite fathers at Knocktopher, parish of Donemagin, Ireland, and at Carlow, he was ordained a priest of the Roman Catholic church, at Kildare, Ireland, in 1878, and came to America in the same year and from then until 1884 had charge of St. Peter's congregation at Windham and also St. Michael's church, at Holbrook, Ia. He as consecrated coadjutor bishop of avenport and titular bishop of Milpotamus in 1904 and was consecrated ishop of Davenport in 1906 succeeding ishop Cosgrove, deceased.

DAVIS, JAMES JOHN (1873), merican labor leader and Cabinet ember; *b.* Tredgar, South Wales. He eceived a limited education in the ublic schools and at the age of 11 went work in iron mills at Pittsburgh, Pa., which city his parents had come with im in 1881. Later he worked as a uddler in steel plants and after moving Elwood, Ind., found employment in n plate mills. He became a leader mong the workingmen and held several inor political offices in Indiana. He as one of the organizers and since 1907 as been a director of the Loyal Order f Moose. On March 5, 1921, he became ecretary of Labor in the Cabinet of resident Harding.

DAVIS, JEFFERSON (1808-89), resident of the Confederate Southern tates at the time of the American ivil War, *b.* at Fairview, Kentucky. is *f.* Samuel, 1756-1824, was of Welsh xtraction. He passed out of the ilitary academy at West Point in 1828; nd distinguished himself in the Black awk Indian War, 1833, and in the exican War, 1846. He made a large ortune from his cotton estates in ississippi and entered politics as a emocrat and supporter of state rights. e was a member of the United States enate, 1847, 1850-51, and 1857-61, and as the leading member of the Demorats of the Southern States. In 1853 e was Secretary of War in the cabinet f President Pierce, and was actively ngaged in the reorganization of the nited States army. His attitude to he slavery question had been clearly hown in his speech in the Senate in 848, and in 1852 he was defeated for he governorship of Mississippi. He was hen convinced that secession might ventually come. The Democratic arty was split owing to his clear dherence to the protection of slavery y the federal government, and on the ection of President Lincoln he stated he case for secession in the Senate, and hen Mississippi seceded he resigned is seat to be unanimously elected resident of the Confederate States at he provisional convention, Feb. 9, 861, and formally inaugurated, Feb. 22. .'s conduct during the war was the bject of much criticism at the time nd since, his continuance of the war spite of the later defeats and of the opeless situation has been extolled as rmness of character or as mere obstiacy by those who differ on the cause for which the war was fought. The failure of the conference for terms of peace, Feb. 1865, due to D.'s instructions to his representatives, led to great diminution in his popularity. After the surrender of the Confederate armies, April, 1865, he was captured in an attempt to escape, dressed in woman's clothes, to carry on the war, and was severely treated as a prisoner in Fort Monroe. His trial for treason, in which it was attempted to connect him with the assassination of Lincoln, was abandoned in the general amnesty, 1868. D. wrote, after his release, the *Rise and Fall of the Confederate Government*, 1881, and *Short History of the Confederate States of America*, 1890.

DAVIS, JOHN (*c.* 1550-1605), Eng. discoverer; sought north-west passage to East, passing through straits since called Davis, 1587; invented quadrant long used, and wrote books on navigation.

DAVIS, JOHN WILLIAM (1873), American lawyer and diplomat, *b.* Clarksburg, W. Va. He graduated from Washington and Lee University, Va., in 1892. He was admitted to the bar in 1895, taught as a professor of law at his Alma Mater, 1896-7, and entered on general practice at Clarksburg, W. Va., in 1897. He engaged actively in politics, was a member of the Virginia House of Delegates, 1899, served in the 62nd and 63rd Congresses, 1911-15, resigning from Congress to become Solicitor General of the United States in 1913. He retained that position until 1918, when he was appointed Ambassador to Great Britain, serving until 1921. He was prominently mentioned for the Democratic Presidential nomination in 1920.

DAVIS, KARY CADMUS (1867), an American agricultural educator, *b.* at Decatur, Ill., *s.* of John and Martha Powell Davis. He was educated at the Kansas State Agricultural College, the Kansas State Normal School and at Cornell University. After being principal of the State High School at Austin, Minn., for six years, he taught science at the State Normal School at St. Cloud, Minn., from 1900-1 and the following year became professor of horticulture at West Virginia University and the Experimental Station at Morgantown. In 1902 he became principal of Dunn co. School of Agriculture, Menomonie, Wis.. and in 1907 dean of the State School of Agriculture at Canton, N. Y. From 1908-13 he was professor of agronomy and principal of agricultural short courses at the State Agricultural College (Rutgers), New

Brunswick, N. J., and in 1913 became professor of agriculture at Knapp School of Country Life, Nashville, Tenn.

DAVIS, KATHERINE BEMENT (1860), American sociologist and welfare worker; *b.* Buffalo, N. Y. She graduated from Vassar College in 1892 and later pursued postgraduate studies in Chicago. She was awarded the degree of LL.D., by Mt. Holyoke College in 1912 and that of M.A. in 1915 by Yale. For fifteen years following 1892 she was head worker at the College Settlement in Philadelphia. She served as superintendent of the New York State Reformatory for Girls at Bedford from 1901 to 1914, and did remarkable work in that capacity. Mayor Mitchell of New York City appointed her Commissioner of Correction in 1914. No woman before her had held that office. She has lectured widely on social and philanthropic subjects. During the World War she was director of Social Hygiene on the Commission of Training Camps, 1918.

DAVIS, NORMAN H. (1878), financial expert, *b.* in Bedford co., Tenn., *s.* of Maclin H. and Christina Lee Schoffner Davis. He was educated at Vanderbilt University and at the University of California. Until 1917 he was engaged in banking and other enterprises in Havana, Cuba, during which time he organized and was president of the Trust Company of Cuba. When the United States declared war against Germany he volunteered his services to the government and was appointed financial adviser to the Secretary of the Treasury, in charge of loans to the allied governments. He was later official financial adviser to President Wilson and the American Peace Delegates at Paris and assisted in drafting the financial provisions in the Peace Treaty.

DAVIS, OSCAR KING (1866), American journalist and author; *b.* Baldwinsville, N. Y. He graduated from Colgate University in 1888. He served as correspondent for the New York Sun and Harper's Weekly during the Spanish-American War, the Boxer Rebellion in China and later in the Philippines. In the Russo-Japanese war he accompanied one of the Japanese armies as special correspondent for the New York Herald. From 1907 to 1912 he was the Washington correspondent of the New York Times and Philadelphia Public Ledger. He was active in the Progressive movement in 1912 and was special correspondent for the Chicago Tribune in the Far East, 1915-16. In 1921 he was appointed delegate from the United States to the first Pan-American Posta Congress. His publications include *A the Emperor's Wish*; *Dewey's Capture Manila; Sherreaf's Exclusive and Oth Stories* and, in conjunction with Reginal Schroeder, *The Storm Birds.*

DAVIS, OWEN (1874), an America dramatist, *b.* at Portland, Me., *s.* Owen Warren and Abbie Gould Davi He was educated at the University Tennessee and at Harvard. He bega writing plays in 1898 and was the autho of many successes produced in Ne York by the Shuberts, Daniel Frohma William A. Brady and Frazee & Ledere some of which were: *The Wishing Ri* with Marguerite Clark in the leadin role, 1910; *An Every Day Man* wit Thomas Ross as leading man, 191 also *Mile a Minute*; *Sinners*; *Forev After* and others.

DAVIS, REBECCA (BLAINE) HARDING (1831-1910), American author; Washington, Pa. She has written man novels and was the first America writer to introduce the labor questio as the theme of a novel. Apart fro extensive contributions to periodica literature, her publications include *Story of Today*, 1861; *Dallas Galbrait* 1868; *A Law Unto Herself*, 1878; *Ke Hampden*, 1892; *Dr. Warrick's Daug ters*, 1896; *Frances Waldeaux*, 189 and *Bits of Gossip*, 1904.

DAVIS, RICHARD HARDING (1864 1916), American journalist, war co respondent and novelist; *b.* Philadelphia Pa. He received his education at Le high and Johns Hopkins Universitie entered newspaper life as a reporter o the Philadelphia Record in 1887 and year later went to New York, where h pungent, striking short stories, full life and local color, almost immediatel established his reputation. After brief connection with Harper's Weekl as managing editor, he became a wa correspondent, one of the most fearle and brilliant in the history of America journalism. He took all kinds of ris and endured the severest hardships the course of the Spanish-America South African, Russo-Japanese an World Wars; and his dispatches we notable for their interest and information. He was a voluminous and popula writer of fiction, and his stories ar marked by vigor and vitality. His publications include *Gallagher and Other Sto ies*, 1891; *The Exiles*, 1895; *The King Jackal*, 1899; *The Bar Sinister*, 1904 *Real Soldiers of Fortune*, 1907; *The Ma Who Could Not Lose*, 1911; and *Th Lost Road*, 1913. He also wrote severa plays, of which the best known is *Ver the Medium.*

DAVIS, ROBERT HOBART (1869), an American editor and dramatist, *b.* at Brownsville, Neb., *s.* of Rev. George Ransome and Silvia Nichols Davis. He was educated in the public schools at Carson City, Nev. He began as a compositor on the Carson Appeal and later went to San Francisco where he was a reporter until 1894 when he founded and edited the Chic. fortnightly in San Francisco. The following year he moved to New York where he was connected with the New York American and later the New York Sunday World. In 1894 he became managing editor of the New York Sunday News but resigned to join the editorial staff of Frank A. Munsey Co., later becoming associate editor of Munsey's Magazine. He also started and was the first managing editor of the All-Story Magazine, Scrap Book, Railroad Man's Magazine, Woman, The Ocean, The Live Wire and The Cavalier. He wrote several plays among which are: *The Room Without a Number*; *The Stain*; and *The Welcher* and was the author of *I Am the Printing Press* and *We Are French.*

DAVIS STRAIT, a body of water varying in width from 200 to 500 miles, separating Greenland from Baffin Land and connecting Baffin Bay with the Atlantic Ocean. It derives its name from John Davis, who discovered it in 1585. It is important as a whaling region. Recent explorations have established the existence of two powerful currents one toward the south on the west of drift ice and another on the east flowing north.

DAVIS, WILLIAM MORRIS (1850), American geologist; *b.* Philadelphia, Pa. He graduated at Harvard University in 1869 and having served as assistant astronomer in the Argentine National Observatory, 1870-73, he returned to this country and in 1878 taught astronomy and geology at Harvard, becoming professor of physical geography in that institution in 1890. From 1899 until 1912 he held the chair of geology at Harvard, becoming professor emeritus in the latter year. In 1911 he was chosen president of the Geological Society of America. He has made many important contributions to science. His publications include *Elementary Meteorology*, 1894; *Physical Geography*, 1899; and *Journeys Across Turkestan*, 1905.

DAVIS, WILLIAM STEARNS (1877), American educator and author; *b.* Amherst, Mass. He graduated from Harvard in 1900, was lecturer at Radcliffe College, 1904-5, instructor at Beloit College, Wis., 1906-7, associate professor of mediæval and modern European history at the University of Minnesota since that date. His publications include *God Wills It*, 1901; *Victor of Salamis*, 1907; *An Outline History of the Roman Empire*, 1909; *The Friar of Wittenberg*, 1912; *A Day in Old Athens*, 1914; *Roots of the War*, 1918; and a *History of France*, 1919.

DAVISON, HENRY POMEROY (1867-1922), American financier, *b.* Troy Pa. He received an academic education at South Williamstown, Mass., and entered upon a business career. He was teller in the Astor Place National Bank, N. Y., 1891-94, assistant cashier, 1894-95, cashier, 1895-98, vice president, 1898-99, and president of the Liberty National Bank, 1899-1902. In the latter year he was made vice president of the First National Bank and later became a member of the banking firm of J. P. Morgan & Co. He was connected with a large number of financial and business corporations. During the war he served as president of the American Red Cross Society, and received decorations from several foreign nations.

DAVISON, WILLIAM (*c.* 1541-1608), Scot. statesman; app. sec. to Walsingham, 1586; accused by Elizabeth of passing on warrant for execution of Queen of Scots against her orders.

DAVITT, MICHAEL (1846-1906), Irish nationalist; became Fenian, 1865; associated with Parnell, 1879-90; several times imprisoned for sedition.

DAVOS (46° 44′ N., 9° 45′ E.), small valley, Alps, Swiss canton of Grisons; contains two villages, Platz and Dörfli; winter health resort. Pop. 7,500.

DAVOUT, LOUIS NICHOLAS (1770-1823), Duke of Auerstadt, Prince of Eckmühl and one of the most brilliant of Napoleon's Marshals; *b.* Annoux, Yonne. He received a military education, entered the army in the cavalry branch in 1788, espoused the cause of the Revolution and won eminence in the incessant wars that marked the closing years of the century. Napoleon recognized his merit and made him a Marshal in 1804. His military career from that time until the downfall of the great Corsican was one of extraordinary brilliancy. At Austerlitz, Auerstadt, Eylau, Friedland, Eckmühl and Wagram, he was one of the chief factors in the victories. He remained loyal to Napoleon and hostile to the Bourbons, being deprived of his titles and estates by the latter, though these were afterwards restored to him. In 1819 he became a member of the Chamber of Peers.

DAVY, SIR HUMPHRY (1778-1829), Eng. chemist. Apprenticed to a surgeon at Penzance, he educated himself in natural philosophy and chem., and became superintendent of Dr. Beddoes' medical 'Pneumatic Institution' at Bristol, where he investigated the physiological properties of nitrous oxide (laughing gas), after having somewhat hastily published an untenable theory of heat and light. App. lecturer in chemistry, later, 1802, prof., at the Royal Institution in London, D. first devoted himself to agricultural chemistry. However, his main researches were in electro-chem., which won him the medal of the Fr. Institute and other scientific honors. Spending several years on the Continent, he proved in Florence that diamond is pure carbon. After his return to England, 1816, he invented the miner's safety lamp bearing his name; Pres. of the Royal Society, 1820-27.

DAVY LAMP, invented by Sir Humphry Davy, an oil lamp having the flame protected by a wire gauze. Air passes through the gauze, but the flame cannot pass outward, and the lamp can be carried with safety in mines where combustible gases obtain. A draught will drive the flame through the gauze, and the latest 'safety' lamps are protected by draught-shields. Electricity is superseding the D. lamp in mines.

DAWES, CHARLES GATES (1865), brigadier general, lawyer and financier, *b.* Marietta, O., *s.* of Gen. Rufus R. Dawes. He graduated from Marietta College in 1884 and three years later from the Cincinnati Law School. From 1887 to 1894 he practiced law at Lincoln, Neb., and afterwards entered into business pursuits. Meantime he took an active part in politics as a Republican, especially in the election of President McKinley in 1896, when he was a member of the Republican National Committee. He was Comptroller of the Currency from 1897 to 1902. In the World War he went to France in 1917 as a colonel of railway engineers. While there he was appointed to the administrative staff of the commander-in-chief of the A.E.F., acting as chairman of the General Purchasing Board and as General Purchasing Agent, and was also a member of the Allied Purchasing Board and of the Liquidating Commission of the Allies. Resigning from the army in 1919, he became the first Director of the Bureau of the Budget in President Harding's administration, took an active part in its establishment, and prepared the first Budget. For his war work he received the Distinguished Service Medal, the Order of Leopold from Belgium, and France made him Commander of the Legion of Honor His writings include an account of th banking system of the United States, volume of essays and speeches, and *Journal of the Great War,* published i 1921.

DAWES, HENRY LAURENS (1816-1903), American legislator; *b.* Cummington, Mass. He graduated at Yale, i 1839, and after engaging in teaching anc newspaper work studied law and wa admitted to the bar in 1842. He tool an active part in politics, was for severa terms a member of the Massachusett Legislature, was elected to Congress i 1875 and in the same year was choser United States Senator. He held tha office for three successive terms, retirin in 1893. Following his retirement, h was Chairman of the Commission to th Five Civilized Tribes of the India Territory. He was a powerful figure i Republican councils.

DAWKINS, WILLIAM BOYD (1838), Eng. geologist and archæologist; prof. o geol. and palæontology at Owen's Coll. Manchester, 1872.

DAWLISH (50° 36′ N., 3° 28′ W.) watering-place, S. coast Devonshire England. Pop. 5,000.

DAWN, the morning twilight, fron the time when the sun is 18° below th horizon to sunrise.

DAWSON, a city of Canada, capita of the Yukon Territory, in the gol region of the Klondike. It is on th east side of the Yukon River, and i 570 miles from Juneau. The firs settlement was made here by a mine who built a house on September 1, 1896 With the discovery of gold in the Yukon Dawson became a large and prosperou town and a port of call for steamship from June to October. Pop. abou 3,000.

DAWSON, CONINGSBY (WILLIAM (1883), English journalist and novelist *b.* High Wycombe, Buckinghamshire He graduated at Oxford in 1905, and i the same year came to America, where he acted as correspondent for English newspapers. He became literary advise to the Doran Publishing Co. in 1910 holding that position until 1913. H served in the World War and was twic wounded. Under the auspices of Mr Hoover he visited and reported on the hunger-stricken areas of Europe, 1919-20. His publications include the *Hous of the Weeping Woman,* 1908; *Murde Point,* 1910; *The Garden Without Walls* 1913; *The Raft,* 1914; *Out to Win,* 1918 *The Test of Scarlet,* 1919; *The Littl House,* 1920; *It Might Have Happene*

You, 1921; *The Kingdom Around e Corner*, 1921; and *Vanishing Point*, 922.

DAWSON, (FRANCIS) WARRING-ON (1878), American author and lec-urer; *b.* Charleston, S.C. He was edu-ated in Paris, France, and at the College ' Charleston, S.C., and entered upon a terary career in 1888. His first work as that of book reviewer for the harleston News and Courier. Later he erved as a newspaper correspondent; pain, 1898; Russia, 1904; Paris, 1905; econd Hague Convention, 1907, and ith the French Army, 1914-16. He ecame an attache of the American mbassy at Paris in 1917. During ne African tour of the late ex-President oosevelt he acted as his secretary. is publications include *The Scar*, 1906; *he Scourge*, 1908; *The True Dimension*, 916, and *The Gift of Paul Clermont*, 921.

DAWSON, GEORGE MERCER 1849-1901), Canadian geologist; geolo-ist and naturalist to N. Amer. Boundary ommission; assistant director, after-ards director, Geological Survey of anada; Dawson City owes its name o him; pres. Royal Society of Canada, 893.

DAWSON, HENRY (1811-78), an nglish painter, born at Hull. With the neager artistic education of a dozen essons from Pyne in 1838, D. succeeded n winning a place among English rtists by his wonderful skill in painting ky and clouds. He was an ardent fol-ower of Constable, and an exhibition f his pictures in 1887, at Manchester, btained for him a well-deserved place mong English painters.

DAWSON, SIR JOHN WILLIAM 1820-99), Canadian geologist; prof. of eol. and principal, M'Gill Univ., ontreal; first pres. of the Royal Soc. f Canada.

DAWSON, MILES MENANDER 1863), an American actuary and lawyer, . at Viroqua, Wis., *s.* of John and artha Ady Dawson. He was educated n public schools, Kentucky University nd New York University. After study-ng law at the latter institution he racticed as insurance lawyer and con-ulting actuary and in addition to being ctuary of the Armstrong investigating ommittee, N.Y. and later of Royal ommission on Life Insurance of anada, he was adviser to N.Y. gov. nd on workmen's compensation, 914; special counsel to the United tates Government in tax litigation, 915-17, and adviser to War Risk Bureau om 1917-21. He was the author of *Practical Lessons in Actuarial Science*, 1897, 1905, and wrote numerous books on insurance.

DAWSON, WILLIAM JAMES (1854), an Anglo-American clergyman and author, *b.* in Towcester, Northampton, England. He was educated at Didsbury College, Manchester, England and in 1875 ordained a minister of the Wesleyan Church. He held various appointments in England, until 1905, when he came to this country. In 1922 he was pastor of the First Presbyterian Church, Newark, N.J. Among his writings are *A Vision of Souls* (poems), 1884; *A Soldier of the Future*, 1908; *The Father of a Soldier*, 1917; and *The Borrowdale Tragedy*, 1920.

DAX (43° 42′ N., 1° 3′ W.), town, on Ardour, Landes, France; ancient *Aquoe*; hot sulphur springs; wood; rock-salt. Pop. 10,000.

DAY.—The *sidereal d.* is the time taken by earth to make one rotation in the interval between two consecutive appearances of a fixed star on the meridian; the *solar d.* is about four minutes longer, and is measured between two consecutive appearances of the sun on a meridian. The *solar d.* varies in length because of variation of earth's motion in its orbit and because equator is inclined to plane of sun's path. The average of the variations is termed the *mean solar d.*

Days of the Week.—Names are of Teutonic origin. Sunday and Monday are called after the sun and moon Tuesday is the day of the god of Tiw (Jupiter), Wednesday of Woden, god of war, Thursday of Thor, god of thunder, Friday of Frigu, goddess of love, Saturday of Saturn, Rom. god of harvests.

DAY, BENJAMIN FRANKLIN (1841), a rear-admiral U.S.N., *b.* at Plymouth, Ohio, *s.* of Benjamin Franklin and Prussia Bunnell King Day. He was appointed to the U.S. Naval Academy from Ohio in 1858, from which he resigned two years later but was reinstated in 1861. He served throughout the Civil War and was wounded in a night engagement in 1863. He afterwards served on various duties and stations including the command of the Navy Yard at Norfolk and later at Boston and the command of several U.S. ships. After advancing through various grades he was made a rear-admiral in 1899 and retired the following year.

DAY, DAVID TALBOT (1859), an American geologist, *b.* at E. Rockport (Lakewood), Ohio, *s.* of Willard Gibson and Caroline Cathcart Day. He graduated from Johns Hopkins University in 1881, and after completing a post-graduate course there, in 1884 became a demonstrator in chemistry and the following year chief of the mining and mineral resources division, University of Maryland. From 1907-14 he was an expert in charge of petroleum investigations for the U.S. Geol. Survey and from 1914-20 was consulting chemist of the U.S. Bureau of Mines at Washington, D.C.

DAY, HOLMAN FRANCIS (1865), an American author, *b.* in Vassalboro, Me. He graduated from Colby College, in 1887, after which he entered journalism, becoming editor of various newspapers in Lewiston and Bangor, Me. Most of his books contain humorous descriptions of the seafaring men of the New England Coast. Among his best known works are *Up in Maine* (verse), 1900; *The Ramrodders*, 1910; *The Skipper and the Skipped*, 1911; *Blow the Man Down*, 1916; *The Rider of the King Log*, 1919; *When Egypt Went Broke*, 1920, and *All-Wool Morrison*, 1921.

DAY, JAMES ROSCOE (1845-1923), an American educator, *b.* in Whitneyville, Me. He studied for the ministry and was ordained to the Methodist Episcopal Church in 1872. Two years later he graduated from Bowdoin College. After serving as pastor in several churches in New England, he became chancellor of Syracuse University, in 1873. As a result of his efforts, Syracuse became one of the leading universities in the United States. Dr. Day was well known for his political utterances. He opposed Theodore Roosevelt in several of his policies and later opposed also the policies of President Wilson in relation to the World War. In 1904 he refused an appointment as bishop of the Methodist-Episcopal Church. He was an ardent defender of the Standard Oil Company and its officers, several of whom were strong supporters of the University. He resigned as chancellor on June 14, 1922, and was appointed Chancellor Emeritus. He was the author of a number of books on labor and other topics.

DAY, JOHN (*c.* 1574), Eng. dramatist; collaborated with Dekker and others; chief work is *Parliament of Bees*, 1641. *Works* edit. by A. H. Bullen, 1881.

DAY, THOMAS (1748-89), Eng. author, eccentric, and philanthropist; wrote *Sanford and Merton.*

DAY, WILLIAM RUFUS (1849-1923), an American jurist and associate Justice of the U.S. Supreme Court, *b.* in Ravenna, O. He attended law lectures at the
University of Michigan and began t
practice in Canton, O., in 1872. Fro
1886 to 1890 he was Judge of the Cou
of Common Pleas. In 1889 he wa
appointed U.S. District Judge for th
Northern District of Ohio but, on ac
count of failing health, was obliged t
decline. In 1897 he was appointe
Assistant Secretary of State. In Apri
1898, he succeeded John Sherman a
Secretary of State, but five months late
was succeeded by John Hay, that h
might go to Paris as head of the Unite
States Peace Commission to negotiat
the treaty that brought the Spanish
American War to a close. From 1889 t
1903 he was U.S. Circuit Judge, of th
Sixth Circuit. In 1903 he was mad
Associate Justice of the Supreme Cour
of the United States. He retired in 192

DAYLESFORD (37° 20′ S., 144° 1
E.), town, Victoria, Australia; gol
mines. Pop. 3,500.

DAYLIGHT SAVING, a movemen
that has met with wide approval, de
signed to secure more daylight fo
business and recreation and to lesse
correspondingly the need of artificia
light. It applies only to the warme
months of the year, and is secured b
moving clocks and watches a certai
distance ahead (usually an hour) at th
beginning of the contemplated perio
and moving them back again at its end
By this fiction advantage is taken of a
additional early hour of daylight tha
would otherwise (by city dwellers a
least) be spent in sleep, and as on
retires an hour earlier at night the nee
of artificial light for that hour is ob
viated. The idea was first brought t
public attention in 1907, when a
Englishman, William Willett, publishe
a brochure entitled, *The Waste of Day
light.* His proposal was that the hou
between two and three on each of th
four Sundays in April should be mad
40 minutes long and that the same hou
on each of four Sundays in Septembe
should be 80 minutes long, thus bringin
the day back in conformity with su
time. His period of daylight savin
for the period indicated was therefor
an hour and twenty minutes. For lega
and parliamentary purposes, as well a
for astronomical and navigation uses
Greenwich time was to govern. Th
publication of his book was the signal fo
a prolonged and violent controversy
It was generally opposed by farmers and
scientists and by some who thought th
proposition was irreligious. To other
it made a strong appeal, and a bill wa
introduced in the House of Common
favoring it, which however failed o
passage. What argument could not ef-
fect was however brought about by the

World War. At a period when every nation involved in the struggle was husbanding its resources, the desirability of saving the many millions that would otherwise be expended for artificial light was obvious. Then too the food resources could be increased by the additional time gained for vegetable gardening in the early evening. Great Britain adopted the essential features of the plan in 1916 and her lead was almost immediately followed by all the warring nations and many of the neutrals. The United States passed a daylight saving law in 1918. Although after the war necessity had passed this was repealed, the plan is still in practice in many parts of the country. Sometimes it is a matter of State enactment. In other cases certain municipalities adopt it while perhaps a neighboring one rejects it. This brings about occasional confusion and annoyance, but as a rule the communities concerned quickly adapt themselves to prevailing conditions.

DAYS OF GRACE. See GRACE, DAYS OF.

DAYTON, a city of Kentucky, in Campbell co. It is on the Chesapeake and Ohio Railroad, and on the Ohio River. It has important industries, including the manufacture of watch cases and pianos. Among the public buildings is the Speers Memorial Hospital. Pop. 1920, 7,646.

DAYTON, a city of Ohio, in Montgomery co., of which it is the county seat. It is on the Erie, the Chicago, Cleveland, Cincinnati and St. Louis, the Chicago and St. Louis, and other railroads, and on the Great Miami River and the Miami Canal, 60 miles northeast of Cincinnati. The abundant water power supplied by the Miami River furnishes power for the manufacturing establishments of the city. Dayton has within the last decade become one of the most important manufacturing cities in the United States. The manufacture of rubber is one of the most important industries and several of the largest rubber companies in the country have immense plants here. Other important manufactures are machine shop products, paper, farming implements, cotton and woolen goods, automobiles, sewing machines, railway cars, and other machinery. The National Cash Register Co. has here its immense plant, which includes homes for employees, recreational and social facilities, etc. It is one of the largest single enterprises in the world. The city is attractively laid out and has many important public buildings, including two courthouses, an old and a new. The charitable institutions include an orphan asylum, widows' home, Southern Lunatic Asylum of Ohio, and the Central National Soldiers' Home. The city has over 50 churches. The public school system is of a high order of excellence. There are also many private schools including the Academy of Notre Dame, the English and Classical Training School, and St. Mary's Institute. Dayton was settled about 1796 and was incorporated in 1805. It became a city in 1841. Pop. 1920, 152,559.

DAYTON, JAMES HENRY (1846), a rear-admiral of the United States Navy, born at South Bend, Ind., son of Daniel and Anna M. Dayton. He graduated from the U.S. Naval Academy in 1866 and after advancing through various grades was made a rear-admiral in 1906. After serving on various duties and stations he was given command of the *Detroit* in 1897 which he retained until 1899 when he was made commandant of the naval station at San Juan. He also commanded the *Chicago* for two years and later was president of the Naval Board of Inspection and Survey. In 1906 he was placed in command of the Philippine Squadron of the Asiatic Fleet and from 1907 until he retired in 1908, he was commander-in-chief of the Pacific Fleet.

DAYTONA, a city in Florida, in Volusia co. It is on the Florida East Coast Railroad and on the Halifax River, Jacksonville, Miami Canal, and the Atlantic Ocean. It is connected with other cities along the coast by steamship lines. In common with other cities on the east coast of Florida, Daytona has become a favorite summer and winter resort within recent years. It has many excellent hotels, a library, and an Elks' Home. It is the center of a fruit growing region and has a large export trade in oranges, strawberries and other fruit. Fishing is also an important industry. Pop. 1920, 5,445.

DEACON (Gk. *diakonos*, servant), member of lowest of three Holy Orders of Christian Church (*i.e.*) bishops, priests, deacons. First indisputable mention is *Epistle to the Philippians* 1^1. In Church of England d's have all powers of priest but absolution and the consecration of bread and wine of Eucharist. In Scottish Presbyterian churches a d. is a layman elected to manage financial affairs of a church.

DEACONESS (Gk. *diakonissa*, servant), name of woman officer in the Early Christian Church; mentioned in III. cent., and continued to exist till V. They assisted in the general services of the church in the same way as deacons, except that they had no priestly powers. The office was revived in XIX. cent. in Prot. churches, hence the establishment of d. institutions by Kirk of Scotland in Edinburgh, by Church of England in London.

DEAD, BOOK OF THE. See Book of the Dead.

DEAD MAN'S HILL, an eminence within the zone of military operation around Verdun, France, during the World War, and so called on account of the sanguinary struggles that took place for its possession between the French and German forces. The most notable of these was in the summer of 1917, on Aug. 21, when the Hill was held by the Germans and had been made seemingly impregnable by means of a system of underground defenses. The French were able to accomplish this notable feat by a heavy bombardment with high explosives. The two battalions of defenders were also taken prisoners.

DEAD SEA (31° 30′ N., 35° 30′ E.), salt lake in S. Palestine, some 25 miles E. of Jerusalem; length, 45 miles; greatest breadth, 9 miles; depth varies from 3 ft. in S. to 1,300 in N.; lies almost 1,300 ft., below level of Mediterranean; receives Jordan and other streams with fertile banks; otherwise surrounded by bleak deserts and stony salt hills; precipitous mts. on E. and W. shores; no apparent outlet. Its waters evaporate in great heat, are intensely salt (25% of salts, as compared with ordinary sea water, *c.* 5%), and contain no animal life; Sodom and Gomorrah were near it; called in Bible Salt Sea, Sea of Plain, East Sea; also known as 'Sea of Asphalt,' 'Sea of Lot.' See Map Palestine.

DEADWOOD, a city of South Dakota, in Lawrence co., of which it is the county seat. It is on the Chicago and Northwestern and the Chicago, Burlington and Quincy railroads. It is the center of the mining region of the Black Hills, and its industries are chiefly connected with mining. There are smelting and reduction works, planing mills, foundries, lime works, etc. The United States Assay Office is here and other public institutions include a public library and a museum. Pop. about 5,000.

DEAF AND DUMB, CARE OF. Schools for the deaf and dumb in the United States have made marked progress in their educational efforts to ameliorate the lot of their pupils. Deaf children are taught to speak their native language and to understand it when spoken by others, or they may, by the use of writing, acquire knowledge and culture without ever learning to speak or to understand the spoken words of others. The congenitally deaf are taught to speak and read the lips of speakers by sight through the sign or finger language and also receive instruction by the speech or oral method.

The afflicted may have been totally deaf from early infancy or birth, or were born with or acquired part deafness, or because adventitiously deaf after they had acquired speech. The success of oral teaching is diminishing the class known as 'deaf mutes,' or those born deaf and denied the power of speech by instruction. Frequently the born deaf are not born mutes. The vocal organs of many deaf children have been shown not to be imperfect, but only retarded in development through lack of exercise. Dumbness in many cases has been a result of deafness and remediable by oral teaching or lip reading. Auricular instruction is also imparted in individual cases where the pupil is not wholly deaf and can sense vibration and rhythm through the employment of the piano and other musical instruments.

In 1919 there were 64 public residential schools for the deaf, with 11,103 pupils; 78 public day schools, teaching 2,010, or 15% of the total number under instruction; and 21 private and denominational schools, with 666 pupils, or 5% of the total student roll. The boarding schools provide free tuition and medical care, industrial training, and in some cases moral and religious instruction. For the boys some sixty trades are taught in various institutions throughout the country, including printing, agriculture, tailoring and carpentry. The girls learn sewing, cooking, millinery, housework, printing, photography, nursing, poultry-raising, dressmaking, and laundry work.

For thousands of adults afflicted with imperfect hearing who need an acquaintance with lip reading to improve their understanding of speech, a method has been developed, known as the Mueller-Walle, and is taught in classes in nearly all the large cities by trained teachers of lip-reading, who can be reached through the Volta Bureau in Washington, D.C. The Mueller-Walle system has been successfully used for educating soldiers and sailors deafened in the World War.

Gallaudet College, a department of the Columbia Institution for the Deaf, Washington, D.C., gives free scholarships to advanced pupils and confers the degrees of bachelor of arts, master of art and master of science. Deafness. See Ear.

DEAK, FERENCZ (1803-76), Hungarian statesman; became representative to Diet, 1832; led Liberal opposition and brought about reconciliation with Austria; Minister of Justice, 1848, but opposed to Kossuth's party and retired; Hungary received constitution, 1860. Deak returned to power, 1861; drew up address to emperor demanding constitution of 1848; in 1866 Austria was forced to concede it.

DEAKIN, HON. ALFRED (1856-1919), Australian Liberal statesman, was elected to Victorian Legislative Assembly 1878, and to the Federal Parliament 1901; was prime minister of Commonwealth, 1903-4, 1905-8, and 1909-10.

DEAL (51° 13′ N., 1° 24′ E.), seaport, watering-place, on E. coast of Kent, England; one of old Cinque Ports; supposed landing-place of Julius Cæsar, 55 B.C.; has two castles built by Henry VIII. Boatmen have reputation for skill and hardihood. Chief industries are provisioning ships, boat-building. Pop. 1921, 12,990.

DEAN (Lat. *decanus*, one set over ten). Used until XV. cent. to denote leader of military force of ten men.

DEAN, ARTHUR LYMAN (1878), an American college president, *b.* at Southwick, Mass., *s.* of William Kendrick and Nellie May Rogers Dean. He graduated from Harvard in 1900 and received the degree Ph.D. from Yale University in 1902. After instructing (mainly in plant physiology) in the latter institution for five years, during which time he was also chief secretary of wood chemistry of the U.S. Forestry Service, 1905-7, he became associated with A.D. Little, a chemist and engineer of Boston, in 1907 and the following year was an instructor in industrial chemistry. In 1909 he returned to Yale University and was assistant professor there until 1914 when he became president of the University of Hawaii, Honolulu.

DEAN, BASHFORD (1867), an Amer. zoölogist, *b.* in New York. He graduated from the College of the City of New York, in 1886, and since 1904 has been professor of vertebrate zoölogy at Columbia University. In 1903 he became curator of herpetology and ichthyology of the American Museum of Natural History and, in the year following, curator of arms and armor in the Metropolitan Museum of Art. He is one of the advisors to the U.S. War Department on armor.

DEAN, FOREST OF (51° 45′ N., 2° 32′ W.), hilly district between Severn and Wye, W. Gloucestershire, Eng.; ancient royal forest; coal and iron mines; stone quarries.

DEAN, JAMES THEODORE (1865), an American army officer, *b.* at Ironton, Ohio, *s.* of Ezra Van Ness and Charlotte Anne Weaver Dean. He graduated from the United States Military Academy in 1887 and from the Army War College at Washington in 1911. After various assignments and promotions was made maj. and chief ordnance officer in Porto Rico and Cuba during the Spanish Amer. War. He later served in Alaska and in the Philippine Islands and in 1917 was made brig.-gen. National Army and during 1918-19 while in command of the 78th Division in France, participated in the St. Mihiel and Meuse-Argonne campaigns. In 1920 he was appointed adj. Philippine Department, Manila, P.I.

DEANE, RICHARD (1610-53), Eng. regicide; naval commander; commanded at *Naseby*, *Preston*, etc.; supported Cromwell in subjugation of Parliament.

DEARING, FRED MORRIS (1879), an American diplomat, *b.* at Columbia, Mo., *s.* of George M. and Marian Elvira Mathews Dearing. He was educated at the University of Missouri and at Columbian (now George Washington) University. He was appointed 2nd secretary of Legation, Peking, China, in 1907, and later held the positions of: secretary of Legation, Havana, Cuba, 1909-10; 2nd secretary American Embassy, London, 1910; secretary Embassy, Mexico City, 1910-11; assistant chief of the Division of Latin American Affairs, Department of State, 1911-13; secretary Legation, Brussels, Belgium, 1913-14; secretary Embassy, Madrid, 1914-16 and, Petrograd, 1916-17; and was with the American International Corporation, New York, from 1917 until 1921 when he was made asst. secretary of State. In 1922 he became E.E. and M.P. to Portugal.

DEATH, permanent cessation of vitality in the whole of the tissues of the body of an animal or plant. The immediate cause of d. may be (1) *syncope*, sudden heart failure, due to disease of the heart or circulatory system, or to shock reacting on the heart by the nervous system; (2) *asthenia*, gradual heart failure from weakening of the whole system by wasting disease or toxins in fevers, etc.; (3) *asphyxia*, when air is prevented from entering the lungs, as in drowning, suffocation, etc.; (4) *coma*, unconsciousness due to a brain lesion or poisoning of the brain through its blood supply, by (*e.g.*) opium or alcohol. D. may, of course, be due to a combination of two or more of the above four modes. The signs of d. include cessation of circulation and respiration, lowering of the body temperature; if a cut is made, the edges of the wound collapse instead of gaping as in life; rigidity of the muscles, or *rigor mortis*, comes on some time after death, and lasts for 24 or 36 hours, commencing at the face and neck; livid colors appear in the parts of the body which are lowest, depending on its position, and, later, a greenish color appears on the abdomen.

DEATH RATE. See VITAL STATISTICS.

DEATH VALLEY, an arid valley between the Panamint and Funeral Mountains, in California. It is crossed by the Amargosa River, which, however, is almost always a dry channel, though undoubtedly at one time it was filled with water. The surface of the valley is covered with salt which is supposed to have been brought by floods from the surrounding desert and left there by the evaporation of the water. Death Valley is the hottest and the dryest portion of the United States. Temperatures of nearly 125° F. have been registered here. A party of emigrants perished while crossing the desert in 1849, hence the name. Many other person have perished in attempting to penetrate and cross this region. It is rich in borax and extensive plants have been established there to prepare this commodity for the market. In various parts of the desert, gold has been found in considerable quantities.

DE BARY, HEINRICH ANTON (1831-88), Ger. botanist; privat-docent, Tübingen; prof. of Bot., Freiburg, 1855; Halle, 1857; Strassburg, 1872, where he was the first rector of the new univ.

DEBENEY, MARIE EUGÈNE, Fr. general, commanded French 1st Army which had the role of defending Amiens during the Ger. attack, March-April 1918; subsequently co-operated with British in great attack of Aug. 8, 1918, and strongly supported the general Allied advance which brought about defeat of Germans.

DEBENTURE, a writing promising to repay a specified sum at a given date, with interest half-yearly. It usually gives a 'floating charge' on the assets of the company issuing the debenture as security for the loan. A floating charge means that the whole of the company's property, present and future, is security for the loan, but that the company, until the charge becomes a fixed charge or the debenture-holders enforce their rights, has power to deal with any specific part of its assets in the ordinary course of its business.

DEBORAH, a character in the *Book of Judges*, represented as encouraging Israelites against Caananites. 'Song of Deborah' at victory of former is assigned by Higher Criticism to earliest period of Jewish literature.

DEBRECZEN (47° 33′ N., 21° 38′ E.), town, Hungary; center of Hungarian Protestants; active trade; cattle markets. Pop. 1920, 103,228.

DEBS, EUGENE VICTOR (1855), an American labor leader, and Socialist, *b.* in Terre Haute, Ind. He received only a common school education and then found employment as a locomotive fireman, also becoming prominent as an official of the Brotherhood of Locomotive Firemen. He was one of the group which seceeded from the railroad trade organizations and formed the general Railway Union, with headquarters in Chicago, becoming its president in 1893. He was leader of the great railroad strike of 1894 and was imprisoned for contempt of court during the period following the strike. It was shortly after this that he came under the influence of Victor Berger, the Milwaukee Socialist, and adopted his doctrines. Since then he has been the recognized standard-bearer of the American Socialist Party and was its nominee for the Presidency in the campaigns of 1900, 1904, 1908, 1912 and 1920. In 1918 he was sentenced for violating the Espionage Act to ten years in a Federal Prison, but was pardoned in 1922. Debs' popularity among his followers rests on his pleasing personality and his abilities as an orator, rather than on his intellectual qualities.

DEBTS, WAR. The national debts of all countries involved in the World War of 1914-18 stood approximately at $305,282,000,000 in 1922. The part the war played in this vast accumulation may be judged by their aggregate pre-war indebtedness, which was $33,024,000,000. In detail the pre-war and post-war debts of the war countries were as follows:

Country	Pre-war debt	Post-war debt
U.S.	$1,027,000,000	$22,691,276,000
U.K.	3,458,000,000	38,000,000,000
Canada	544,000,000	2,340,878,984
India	1,495,000,000	2,264,000,000
Australia	93,000,000	1,956,000,000
N.Z.	446,000,000	961,000,000
Union of S. Africa	615,000,000	847,000,000
France	6,598,000,000	53,000,000,000
Italy	3,031,000,000	22,000,000,000
Russia	5,092,000,000	25,383,000,000
Japan	1,261,000,000	1,216,000,000
Portugal	437,000,000	2,061,000,000
Roumania	319,000,000	5,800,000,000
Belgium	722,000,000	6,562,000,000
Finland	32,000,000	373,000,000

Greece	188,000,000	1,200,000,000
Poland	....	2,410,000,000
Serbia Montenegro	175,000,000	548,000,000
Brazil	745,000,000	1,254,000,000
Germany	1,228,000,000	80,000,000,000
Austria	2,631,000,000	12,000,000,000
Hungary	1,602,000,000	12,000,000,000
Czecho-Slovakia	....	8,000,000,000
Bulgaria	171,000,000	1,252,000,000
Turkey	667,000,000	2,050,000,000

The currencies of countries nominally or actually on a gold basis have been converted into American dollars at pre-war parity in the above table. In the case of those nations whose debts were stated in terms of a high depreciated currency, approximate exchange equivalents have been utilized for computation. The Russian ruble, the German mark and the Austrian crown were specially dependable as a basis for dollar values.

There was a general increase in debts after the war, with Great Britain and the United States standing out as notable exceptions in this respect. Annual deficits in most other countries augmented the national debts, already swollen by war expenditures. The deficits created the need of borrowing from banks of issue, who received virtually a free hand to print paper currency, which they loaned to the borrowing governments upon the latters' treasury obligations. The effect was rising debts stimulated by currency inflations, due to an orgy of expenditures that could not be met by taxation. So government outlays became more and more met by expanding currency issues rather than by tax levies. This was specially the case of Austria, Poland, Germany and Russia, with a consequent enormous increase in the sums these countries owed. For example, Austria's currency was nine times larger in 1922 than it was in 1921; Germany's currency issues swelled her obligations four-fold in the same period; Poland's increased 50 per cent. In the case of Germany, it was reported in November, 1922, that the government's debts then totaled 845,365,000,000 marks, or 172 times as much as the pre-war debt in marks. The exchange at that time was 8,000 marks to the dollar. This enormous depreciation, if used as a basis for determining Germany's indebtedness in dollars, would make her owe only $100,000,000 gold, as against a pre-war debt of $1,228,000,000 gold.

Most of the allied countries incurred considerable indebtedness to Great Britain and the United States, and the sums they owed these governments accounted for leading items in their national debts. Great Britain also borrowed largely from the United States. The sums owing to Great Britain, approximately amounting to $10,814,000,000 were as follows:

Overseas Dominions and other possessions	$ 750,000,000
Russia	3,275,000,000
France	2,920,000,000
Italy	2,515,000,000
Jugo-Slavia	125,000,000
Portugal, Rumania, Greece and other allies	3,035,000,000
Relief and Reconstruction loans to Central European countries	105,000,000
Belgium Reconstruction Loan	45,000,000
Armenia	4,000,000
Czechoslovakia	10,000,000

The following table shows the loans made by the United States to allied countries as the amounts stood in November, 1922, according to Secretary Mellon of the Treasury, who then stated that the allied debt to the United States totaled $10,045,282,026.60, inclusive of principal and interest:

Armenia	$ 13,637,174
Austria	26,942,394
Belgium	437,197,129
Czechoslovakia	106,292,205
Esthonia	16,088,771
Finland	9,294,362
France	3,844,132,250
Great Britain	4,604,128,085
Greece	15,750,000
Hungary	1,888,135
Italy	1,932,715,485
Latvia	5,775,864
Lithuania	5,728,872
Poland	153,281,676
Rumania	41,992,599
Russia	232,813,968
Serbia	59,098,683

The only country up to early in 1923 that was in a position to make funding arrangement for the redemption of their indebtedness to the United States was Great Britain. In February in that year an Anglo-American commission agreed on terms which received the sanction of the President and of Congress. These terms represented a settlement in which the principal of notes to be refunded was named at $4,074,818,358.44. Interest accrued and unpaid amplified this amount to $4,604,128,085.74, of which $4,128,085.74 was to be paid in cash and for the major sum, $4,600,000,000, the British government would issue bonds to the U.S. government at par. Great Britain undertook to pay off these bonds in sixty-two years, or annually on a fixed schedule, subject to her option to make these payments in three-year periods. The instalment for 1923 was fixed at $23,000,000 for the principal. The annual payments were to so increase year by year that in the sixty-second year the final instalment would be $175,000,000 and would close the principal debt. The interest is payable half yearly at 3 per cent. up to 1932, and thereafter at 3½ per cent. until the final payment. In 1923 Finland and the United States were in negotiation with a view to an adjustment of the former's debt on a similar basis.

The post-war debt of the United States, namely, $22,691,276,000, or more than twenty times the amount of the country's pre-war indebtedness, involved in 1922 an annual interest charge of $989,485,410, and represented a per capita debt of $206.77.

DE BUNSEN, SIR MAURICE (1852), Brit. diplomat; the Brit. ambassador at Vienna when the World War broke out; his correspondence showed that Count Berchtold was entering upon an amicable discussion with Russia, when Germany stepped in and forced war; under-secretary at the Foreign Office, 1914.

DEBUSSY, CLAUDE ACHILLE (1862-1918), a French composer, *b.* in St. Germain-en-Laye. He was the leader of the modern school of extremists who reacted against old conventional forms and sought new methods of expression. In 1884 he paid a prolonged visit to Russia and there came under the influence of the Russian composers. At this time his early compositions had already earned him some popularity, but now followed a period during which he was regarded as little more than a freak. In 1902, however, his opera *Pelleas and Melasande* was produced, and although peculiarly unconventional, it immediately brought him back into public favor. He also composed *La Mer*, and other dramatic pieces, music to *King Lear*, *Tres Nocturnes*, *Proses Lyriques*.

DECADE. See CHRONOLOGY.

DECADENCE. See ART.

DECALOGUE ('The ten words'), Ten Commandments. Term originated in Gk. Church, and was first used in English by Wycliffe. Ten Commandments are stated in *Exodus* to have been written by God on two tables of stone, broken by Moses, and afterwards inscribed on two new tables according to revelation of Jehovah to Moses on Mount Sinai. Accounts in *Exodus* and *Deuteronomy* disagree as to second tables. The division of the Commandments is uncertain; system adopted in Orthodox Eastern, Anglican, and most Calvinistic Churches is known as Philonic, from work of Gk. father, Philo; while Rom. Church, followed by Lutherans, adopted views of St. Augustine.

DECAMERON, SEE BOCCACCIO.

DE CANDOLLE, AUGUSTIN PYRAME (1778-1841), pioneer of systematic bot.; prof. of bot. at Montpellier, 1808-16; inspired the finest work of descriptive bot. yet produced—*Prodromus Systematis Naturalis.*

DECAPOLIS (32° 37′ N., 35° 50′ E.), league of 10 cities E. and W. of Jordan, Palestine; enumerated by Pliny—Damascus, Philadelphia, Raphana, Scythopolis, Garada, Hippos, Dion, Pella, Gerasa, Kanatha; only Scythopolis (the capital) lay west of Jordan. Population, mainly non-Jewish, enjoyed liberal civic rights and the privilege of coinage.

DE CARTIER DE MARCHIENNE, BARON EMILE (1871), a Belgian diplomat, *b.* at Brussels, Belgium. He was educated in Belgium and later received the degree LL.D. from Princeton University in 1917, from Villanova in 1918 and from Brown University in 1921. He was appointed Ambassador Extrardinary and Plenipotentiary from Belgium to the United States in August, 1919.

DECATUR, a city of Georgia, in De Kalb co., of which it is the county seat. It is on the Georgia Railroad, 6 miles east of Atlanta. The excellence of its climate has made it a favorite resort for both summer and winter for people from the North. Here is the Agnes Scott Institute for Young Ladies. It is connected by railway with Atlanta. In the vicinity, on July 20, 1864, a battle was fought between a part of Sherman's army, commanded by General Thomas, and the Confederate army under General Hood. The Confederates retreated at nightfall after a severe battle. The Confederate loss was estimated at 5,000 while the Union loss was about 1,500. Pop. 1920, 6,150.

DECATUR, a city of Illinois, in Macon co., of which it is the county seat. It is on the Wabash, the Illinois Central, and the Cincinnati, Hamilton and Dayton railroads, and on the Sangamon River, 173 miles S.W. of Chicago. The city is the center of the famous Illinois corn belt, and is the chief trade depot of several counties. It has great industrial importance and has iron works, flour mills, planing mills, railroad car shops, and plants for the manufacture of farm implements, carriages, engines, boilers, water works equipment, electric light fixtures, soda fountains, etc. It is the seat of the James Milliken University. It has a hospital, parks, many churches, etc. Pop. 1920, 43,818.

DECATUR, STEPHEN (1779-1820), an American naval officer, *b.* in Sinepuxent, Md. He studied at the University of Pennsylvania, then took a position as clerk in a firm of shipowners in Philadelphia. In 1798 he procured an appointment as midshipman in the Navy, where he showed such ability that within a year he had been commissioned a lieutenant. He first distinguished himself in the Tripolitan War, in which, as commander of a schooner, *The Enterprise*, he captured a larger craft than his own and then sailed into the harbor of Tripoli, cutting out and destroying a frigate. In 1804 he had command of a flotilla of gunboats, with which he attacked the Tripolitan flotilla and captured two gunboats, after 'the biggest little fight in history.' In the War of 1812, while commanding the frigate *United States*, he was captured by a British fleet outnumbering him, for which he was later courtmartialed, but exonorated. It was in the punitive expedition to the Barbary Coast, however, that he especially distinguished himself, creating such havoc among the enemy ships and land fortifications that he forced a peace on the Bey of Algiers, the Bey of Tunis and the Bashaw of Tripoli. He was killed in a duel with Commodore James Barron.

DECAZES, ÉLIE (1780-1860), Fr. politician; duc 1820; prime minister, 1819; faithful to monarchy, but passed reforms and excited fear of ultra-royalists; accused of murder of Duc de Berry and resigned, 1820.

DECAZEVILLE (44° 34′ N., 2° 14′ E.), town, Aveyron, France; coal-fields; iron manufactures. Pop. 9,000.

DECCAN (*c.* 16° N., 76° 30′ E.), name applied to whole peninsula of India, S. of Vindyha mountains, between Bay of Bengal on E. and Arabian Sea on W.; sometimes limited to that portion of tableland between Nerbudda and Kistna.

DECEASED WIFE'S SISTER, MARRIAGE WITH A, rendered legal in England by Act of Parliament passed in 1907. All such marriages, whether contracted before or after the passing of the Act, were validated as civil contracts.

DECEMBER (Lat. *decem*, ten), the tenth month in ancient Rom. calendar.

DECEMVIRS (Lat. *decemviri*, ten men), colleges or commissions of ten Rom. magistrates; drew up famous Twelve Tables of Rom. law; administered religious matters, decided as to civil rights, and allotted public land.

DECHEN, ERNST HEINRICH KARL VON (1800-89), Ger. geologist; director of the Prussian Mining Department in Bonn. His survey and geological maps of Rhenish Prussia and Westphalia greatly furthered the Ger. mining and metallurgical industries.

DECIDUOUS, term applied in bot. and zoöl. to the seasonal shedding of, (*e.g.*) leaves, or hairs, antlers, etc. Milk teeth are called deciduous.

DECIMAL COINAGE, currency in which the coins are multiples of ten with regard to a standard unit. With the exception of Great Britain and India all leading countries have adopted d.c., the U.S. being the first (1792).

DECIMAL FRACTIONS. See ARITHMETIC.

DECIMAL SYSTEM, the name applied to any system of weights, measures, etc., which has the standard unit divided into tenths, hundredths, etc., for parts below it, and multiplied by ten or powers of ten for parts above it in value. It has been adopted for weights and measures and money in most of the European countries, but has been rejected in England and America for various reasons, one of the chief being that our system possesses better facilities for dividing into halves and quarters with fairness to purchasers than does the D.S. It has been found inapplicable to time.

DECIUS, CAIUS MESSIUS QUINTUS TRAJANUS (201-51), Rom. emperor of Illyrian extraction; did much to retard advance of Goths; great persecutor of Christians.

DECIZE (46° 51′ N., 3° 29′ E.), town, Nièvre, France, on island in Loire; glassworks; ancient *Decetia*. Pop. 5,000.

DECLARATION OF INDEPENDENCE, the document which proclaimed the independence of British rule of the 13 American colonies. Already several of the provinces, as regards their administrative system were independent of the mother country. Massachusetts, and South Carolina had established commonwealths. John Adams was largely responsible for the passage of resolutions by Congress May 10-15, recommending the commonwealth system for independent governments. The declaration for entire independence of the states grew out of this action. On June 7, 1776, Richard Henry Lee moved the resolution in Congress that 'these united colonies are, and of right ought to be, free and independent states, that they are absolved from all allegiance to the British crown, and that all political connection between them and the State of Great Britain is, and ought to be, dissolved.' On June 10 a committee was appointed with Jefferson as chairman, and including Benjamin Franklin, Livingston, and others to prepare a declaration to the effect of the said first resolution (John Adams'). Jefferson drafted the declaration and Adams and Franklin supplied amendments to Jefferson's harsh attack on the British people and on George III., for the slave trade. Lee's resolution was passed July 2, and the Declaration of Independence July 4, 1776. All the colonies endorsed the declaration, but New York, whose delegates were not then empowered to vote on the question, but gave their support on July 9. On August 2, the 53 delegates present signed the Declaration. Three absentees signed later. The document was engrossed on parchment and copies were sent 'to the Assemblies, Committees, or Councils of Safety, and to the Commanders of the Continental troops, and to be proclaimed in each of the United States and at the head of the army.' The original document was long on exhibition in Washington, but owing to the damaging effects of light on the writing it was withdrawn in 1894 and a facsimile substituted. The original manuscript is now deposited in the Library of Congress, Washington, D.C.

Following the test of the Declaration of Independence:

When, in the Course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the Laws of Nature and of Nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness. That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed, That whenever any Form of Government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their Safety and Happiness. Prudence, indeed, will dictate that Governments long established should not be changed for light and transient causes; and accordingly all experience has shown, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same Object evinces a design to reduce them under absolute Despotism, it is their right, it is their duty, to throw off such Government, and to provide new Guards for their future security. Such has been the patient sufferance of these Colonies; and such is now the necessity which constrains them to alter their former Systems of Government. The history of the present King of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute Tyranny over these States. To prove this, let Facts be submitted to a candid world.

He has refused his Assent to Laws, the most wholesome and necessary for the public good.

He has forbidden his Governors to pass Laws of immediate and pressing importance, unless suspended in their operation till his Assent should be obtained; and when so suspended, he has utterly neglected to attend to them.

He has refused to pass other Laws for the accommodation of large districts of people, unless those people would relinquish the right of Representation in the Legislature, a right inestimable to them and formidable to tyrants only.

He has called together legislative bodies at places unusual, uncomfortable, and distant from the depository of their public Records, for the sole purpose of fatiguing them into compliance with his measures.

He has dissolved Representative Houses repeatedly, for opposing with manly firmness his invasions on the rights of the people.

He has refused for a long time, after such dissolutions, to cause others to be elected; whereby the Legislative powers, incapable of Annihilation, have returned to the People at large for their exercise; the State remaining in the meantime exposed to all the dangers of invasion from without, and convulsions within.

He has endeavored to prevent the population of these States; for that purpose obstructing the Laws for Naturalization of Foreigners; refusing to pass others to encourage their migration hither, and raising the conditions of new Appropriations of Lands.

He has obstructed the Administration of Justice, by refusing his Assent to Laws for establishing Judiciary powers.

He has made Judges dependent on his Will alone, for the tenure of their offices, and the amount and payment of their salaries.

He has erected a multitude of New Offices, and sent hither swarms of Officers to harass our people, and eat out of their substance.

He has kept among us, in times of

peace, Standing Armies, without the Consent of our legislature.

He has affected to render the Military independent of and superior to the Civil power.

He has combined with others to subject us to a jurisdiction foreign to our constitution and unacknowledged by our laws; giving his Assent to their Acts of pretended Legislation: For quartering large bodies of armed troops among us: For protecting them by a mock Trial from punishment for any Murders which they should commit on the Inhabitants of these States: For cutting off our Trade with all parts of the world: For imposing Taxes on us without our Consent: For depriving us in many cases of the benefits of Trial by Jury: For transporting us beyond Seas to be tried for pretended offenses: For abolishing the free System of English Laws in a neighboring Province, establishing therein an Arbitrary government, and enlarging its Boundaries so as to render it at once an example and fit instrument for introducing the same absolute rule into these Colonies: For taking away our Charters, abolishing our most valuable Laws and altering fundamentally the Forms of our Governments: For suspending our own Legislatures, and declaring themselves invested with power to legislate for us in all cases whatsoever.

He has abdicated Government here by declaring us out of his Protection and waging War against us.

He has plundered our seas, ravaged our Coasts, burnt our towns, and destroyed the lives of our people.

He is at this time transporting large Armies of foreign Mercenaries to complete the works of death, desolation and tyranny, already begun with circumstances of Cruelty and perfidy scarcely paralleled in the most barbarous ages, and totally unworthy the Head of a civilized nation.

He has constrained our fellow Citizens taken Captive on the high Seas to bear Arms against their Country, to become the executioners of their friends and Brethren, or to fall themselves by their Hands.

He has excited domestic insurrections amongst us, and has endeavored to bring on the inhabitants of our frontiers, the merciless Indian Savages, whose known rule of warfare is an undistinguished destruction of all ages, sexes and conditions. In every stage of these Oppressions We have Petitioned for Redress in the most humble terms. Our repeated Petitions have been answered by repeated injury. A Prince, whose character is thus marked by every act which may define a Tyrant, is unfit to be the ruler of a free people. Nor have We been wanting in attentions to our British brethren. We have warned from time to time of attempts by their legislature to extend an unwarrantable jurisdiction over us. We have reminded them of the circumstances of our emigration and settlement here. We have appealed to their native justice and magnanimity, and we have conjured them by the ties of our common kindred to disavow these usurpations, which would inevitably interrupt our connections and correspondence. They too have been deaf to the voice of justice and of consanguinity. We must, therefore, acquiesce in the necessity, which denounces our Separation, and hold them, as we hold the rest of mankind, Enemies in War, in Peace Friends.

We Therefore, the Representatives of the United States of America, in General Congress, Assembled, appealing to the Supreme Judge of the world for the rectitude of our intentions, do, in the Name, and by authority of the good People of these Colonies, solemnly Publish and Declare, That these United Colonies are, and of Right ought to be Free and Independent States; that they are Absolved from all Allegiance to the British Crown, and that all political connection between them and the State of Great Britain is and ought to be totally dissolved; and that as Free and Independent States, they have full Power to levy War, conclude Peace, contract Alliances, establish Commerce, and to do all other Acts and Things which Independent States may of right do. And for the support of this Declaration, with a firm reliance on the protection of Divine Providence, we mutually pledge to each other our Lives, our Fortunes, and our sacred Honor.

DECLARATION OF LONDON, international agreement dealing especially with questions of contraband, blockade, the sinking of neutral prizes, and the transfer of enemy ships to a neutral flag. On Oct. 29, 1914, an Order in Council was promulgated, putting in force the provisions of the Declaration, subject to the exclusion of the lists of contraband and non-contraband required by the Declaration, and with certain modifications as to destination and the seizure of conditional contraband.

DECLARATION OF PARIS (1856). Following agreements concluded by most of Great Powers: (1) abolishment of privateering; (2) neutral flag covers enemy's goods, except contraband of war; (3) neutral goods under enemy's flag not liable to capture; (4) blockades to be binding must be effective. Spain, America, Venezuela, and Mexico refused to agree, but when Span.-Amer. War broke out, 1898, Spain and America bound themselves to respect the declaration.

DECLARATION OF RIGHTS. See RIGHTS, DECLARATION OF.

DECLINATION (magnetism), the angle between a magnetic needle and the geographical meridian; (astron.) angular distance between the celestial equator and a heavenly body.

DECOLORIZING, in chem. and sugar industry, the elimination of colored impurities, usually by means of powdered charcoal, also by permanganates or sulphurous acid.

DE COPPET, CAMILLE (1862), a Swiss public official, *b.* in the canton of Vaud. In 1912 he became a member of the Swiss Federal Council, becoming head of the War Department later during the World War, until 1916, when he became President of the Council. In 1920 he became director of the International Bureau of the Universal Postal Union.

DECORATED STYLE, in arch., the second Pointed or Gothic style (XIV. cent.).

DECORATION DAY, or **MEMORIAL DAY**, a day set apart by most of the northern States for decorating the graves of soldiers of the Union armies who fell in the Civil War. It was on May 5, 1868, that General John A. Logan, then commander-in-chief of the Grand Army of the Republic, appointed May 30 as a Memorial Day, that being the date of the discharge of the last volunteers. This date is a legal holiday in the United States and Porto Rico, Hawaii, Alaska, and the District of Columbia, except in Arkansas, Florida, Louisiana, Mississippi, North and South Carolina and Texas. Some of the Southern States have also a Memorial Day when the graves of fallen Confederates are decorated.

DECORATIONS, AMERICAN MILITARY. The bestowal of decorations and medals for distinguished military services, practiced among almost all nations since the dawn of history, has been a custom of slow growth in the United States. This was due no doubt to close adherence to the idea of republican simplicity. It was thought that decorations were akin to a title of nobility and part and parcel of the monarchical system. The first medal bestowed by our Government was one in gold on General George Washington, following the evacuation of Boston by the British. John Paul Jones was similarly rewarded after his famous victory over the *Serapis*. Some of the commanders in the wars of 1812 and the Mexican War were thus honored, as was General Grant after his victory at Chattanooga in 1863. It was not until 1861 that the Medal of Honor was instituted by act of Congress as an American decoration. At first it applied to the navy but in 1863 was amended to include the army. Modifications have been made in the law from time to time, until today it reads:

The President is authorized to present in the name of Congress a Medal of Honor only to each person, who, while an officer or enlisted man in the army, navy or Marine Corps shall hereafter in action involving actual conflict with an enemy, distinguish himself conspicuously by gallantry and intrepidity at the risk of his life, above and beyond the call of duty.

The Distinguished Service Cross is awarded for individual acts of 'extraordinary heroism in connection with military operations against an armed enemy' not sufficiently great however to meet the supreme distinction of the Medal of Honor. The Distinguished Service Medal is awarded to any person who shall 'distinguish himself or herself by specially meritorious Service to the Government.'

In addition to these three decorations a Victory Medal was awarded to every one of the 4,600,000 soldiers, sailors, marines, nurses and doctors who served in the World War.

The Navy Cross can be awarded to any one in the naval service who distinguishes himself by extraordinary heroism or by distinguished service. It is broader in its scope than the Distinguished Service Cross in the Army. The latter can be given only for heroism in action, but the Navy Cross, in addition to this, includes any other distinguished service, not only in war but in peace.

The total number of decorations awarded by the United States Government for World War service was 8,322. Of these, 95 were Medals of Honor, 6,151 Distinguished Service Crosses, and 2,076 Distinguished Service Medals.

DE COSTA, BENJAMIN FRANKLIN (1831-1904), an American clergyman and writer, *b.* in Charlestown, Mass. After being ordained a minister of the Episcopal Church, he was rector in North Adams, Mass., for many years. In 1889 he became a Roman Catholic. Among his works are *The Pre-Columbian Discovery of America by the Northmen*, 1869; *The Moabite Stone*, 1870; and *Whither Goest Thou*, 1902. For many years he was editor of The Christian Times.

DECREE, judgment by one in authority; in Eng. law the judgment of a court. In divorce petitions a *decree nisi* is a conditional dissolution of marriage, which may be made *absolute* six months later.

DECRETALS (med. Lat. *decretales*, *i.e. epistoloe decretales*), letters of popes issuing decrees; they form important parts of canon law.

DECURION (Lat. *decurio*), Rom. title for head of *decuria*, the 10th part of *curia*, and senators of Rom. towns and colonies.

DÉDÉ AGACH (40° 48′ N., 25° 47′ E.), seaport, on Ægean Sea, in vilayet Adrianople; timber.

DEDHAM, a town of Massachusetts, in Norfolk co., of which it is the county seat. Within it are included three villages. It is on the New York, New Haven and Hartford Railroads, and on the Charles River. Dedham is a favorite residential suburb of Boston. It is, however, also an important industrial community and has manufactures of cotton and woolen goods, carpets, handkerchiefs and pottery. Its notable buildings include a Memorial Hall, public library, and the building of the Historical Society. There is also a county court-house, a jail, and a house of correction. Dedham was settled in 1636 and in 1645 the first free school in America was established here. It is a place of great historic interest. Pop. 1920, 10,792.

DEDICATION (Lat. *dedicatio*), setting apart in honor of Deity or for sacred purpose; originates in Jewish custom, consecration of tabernacle being mentioned in *Exodus*; temple of Solomon dedicated, and Feast of D. established to commemorate reconsecration, 165 B.C., after desecration by Seleucid king. Christ recognized the Feast (*John* 11-22-3), and custom of d. was probably adopted by first Christians, although no mention of it is found till 314 A.D.

DEDUCTION, form of reasoning which proceeds from universal to particular, or from the more to the less general.

DEE.—(1) (53° 17′ N., 3° 8′ W.), River, England, rises in Lake Bala, Merionethshire; flows generally N., enters Irish Sea, N.W. of Chester. (2) (57° 5′ N., 2° 15′ W.), River, Kincardineshire and Aberdeenshire, Scotland; rises in Cairngorm Mts.; flows into North Sea at Aberdeen. (3) (54° 55′ N., 4° W.), River, Kirkcudbrightshire, Scotland; flows from Loch Dee to Solway Firth.

DEE, JOHN (1527-1608), Eng. astrologer and alchemist; imprisoned for sorcery; afterwards patronized by Queen Elizabeth; had an adventurous life; wrote mathematical and spiritualistic works.

DEEMS, CHARLES (ALEXANDER) FORCE (1820-93), Amer. preacher, author, and social reformer; pastor, 1868-93, of Church of the Strangers, New York, founded by himself.

DEEP-SEA EXPLORATION. Oceanography, or the exploration of ocean depths and the deep-sea floor is comparatively a modern science, dating back about half a century. Up to the time of the voyages of Captain Cook, the ocean had been sounded only to the depth of a few hundred fathoms. Of late years, a score of vessels, thoroughly equipped for hydrographical, geological and biological investigations, have been sent out by the English, American, French, German, Austrian, Dutch, Russian, Swedish and Norwegian Governments, and the results obtained have been exceedingly interesting and important.

Many elaborate implements and devices are employed to sound the ocean depths and bring up specimens of soil, flora and marine life. Thousands of fathoms of piano wire, wound and unwound by reels, are required. At or near the end of the wire are attached a water bottle, for securing samples of water at the bottom, a thermometer to record the temperature at varying depths and a rod to bring up specimens of the mud of the ocean floor. A dredge is employed to draw up varieties of marine life. This dredge which is a bag-shaped net, more or less heavily weighted, is dragged along the bottom, gathering in its quarry and then is lifted and swung on board.

Plant life is found only at slight depths, as it cannot exist below the influence of sunlight. Animal life exists at vastly greater depths. The specimens brought up consist of fishes, mollusks, crustacea and echinoderms, varying greatly in genera and species from those existing in shallow waters. Fishes have been brought up from a depth of 1,770 fathoms and live sponges from a depth of 4,178 fathoms. It has been ascertained that there are wide tracts of ocean, notably in the mid-Pacific which are almost wholly lacking in surface forms of life and where the bottom is correspondingly devoid of animal life.

Many great depressions, amounting to abysses, have been found in the course of deep-sea exploration. Ten of these exceed 24,000 feet each. The greatest depth discovered was off the coast of Mindanao, where a sounding was made of 406 feet more than six miles. The average depth of the ocean is probably about 13,000 feet.

It has been found that below the levels reached by sunlight the ocean is in total darkness. A photographic plate left for two hours at a depth of 900 feet was not at all affected. In places there is probably a very faint and unevenly distributed light coming from fish with phosphorescent organs.

At the depth of 900 fathoms the temperature of the sea is always within three or four degrees of the freezing point of fresh water. The settling of cold surface waters in the polar regions and its distribution over the ocean floor is responsible for this low temperature. The coldness of the water carries with it enough oxygen to maintain life in the lowest depths.

The saltness of various seas differs according to the amount of evaporation that goes on. It is highest in the Red Sea and the Mediterranean, higher in the Atlantic than in any other of the great open oceans and lowest in the Baltic and Black seas.

Experiments have shown that sea pressure amounts to about 2,000 pounds to the square inch with every six thousand feet of depth. At the greatest depth known, over six miles, the pressure is about six tons to the square inch. Ordinary surface fishes could not endure this pressure, but the tissues of deep sea specimens are sufficiently permeated with fluids to withstand it.

No monster fishes have been drawn from the sea depths. The largest specimens secured do not exceed four or five feet in length. See OCEANOGRAPHY.

DEER FAMILY (*Cervidoe*), family of ruminant even-toed Ungulates with 120 species found frequenting bush and forest tracts throughout world—except Africa, S. of Sudan, and West Indies; male generally provided with antlers—branched, bony structures covered during growth with a skin or 'velvet,' without fleshy covering during breeding season, and shed yearly. Young deer are known as fawns.

DEERFIELD, a city of Massachusetts, in Franklin co. It is on the Boston and Maine, and the New York, New Haven and Hartford railroads, and the Connecticut River, 33 miles N. of Springfield. It is the center of an important agricultural region and is also noted for the manufacture of pocketbooks. It has a high school and a public library. The town contains the village of South Deerfield, which is famous as being the scene of several conflicts with the Indians in colonial times. Among these were the 'Bloody Brook Massacre' in 1675, and the burning of the village by the French and Indians in 1703. A marble monument commemorates the former incident. There is also a soldiers' monument in Old Deerfield. Pop. 1920, 2,803.

DEFAULT, neglect to perform an act required by law, or to appear in court in answer to legal summons.

DEFENDER OF THE FAITH, *Fidei Defensor*, title borne by all Eng. sovereigns since, and including Henry VIII., on whom it was bestowed by the Pope for writing against Luther, 1521.

DEFENSE, in Eng. law, answer to a charge; claim of justification for act committed. In regard to physical d. a person has full right to use any necessary force to protect himself from attack.

DEFENSE ACT, NATIONAL. See ARMY, UNITED STATES.

DEFENSE COUNCIL. See AMERICANIZATION.

DEFFAND, MARIE ANNE DE VICHY-CHAMROND, MARQUISE DU (*c.* 1697-1780), Fr. authoress; presided over famous salon.

DEFIANCE, a city of Ohio, in Defiance co., of which it is the county seat. It is on the Wabash and the Baltimore and Ohio railroads, and on the Maumee River and the Miami and Erie Canal, 50 miles S. of Toledo. It is an important trade center and has manufactures of woolen goods, flour, machinery and carriages. There are two banks, and daily and weekly newspapers. Pop. 1920, 8,876.

DEFIANCE COLLEGE, a co-educational, non-sectarian institution in Defiance, O., originally founded in 1850 as the Defiance Female Academy, but assuming its present name, together with its broader character, in 1902. It has four departments; the general academy, music, normal and commercial. In 1921-22 it had an attendence of 267 students and a staff of teachers numbering 24.

DEFINITION, explicit statement of just those attributes, no more and no less, which are implied by a name.

DEFOE, DANIEL (1661-1731), Eng. author and pamphleteer; son of a London butcher; educated at a Dissenting academy, where he laid the foundations of the encyclopædic knowledge displayed in his works. The Jacobite plots against William III. gave occasion to his first known pamphlet, *A New Discovery of an Old Intrigue*, 1691. A born pamphleteer, he wrote naturally and forcibly. He pub.

The Shortest Way with the Dissenters, 1702, and for this he was convicted of seditious libel, fined, pilloried, and imprisoned by Anne's Tory government. Harley sent him to Scotland, 1706, to promote the Union of the Parliaments. Between 1704 and 1713 Defoe carried on his famous *Review*, written entirely by himself. Later he wrote for the *Mercator*, which aimed to promote Bolingbroke's commercial treaty with France. In 1719 he achieved success with *Robinson Crusoe*, which has since been acclaimed throughout the world as one of the masterpieces of Eng. prose literature. It was founded on the actual experiences of Alexander Selkirk, told by himself to Defoe. Other works of high literary quality are *Captain Singleton*, *Moll Flanders*, *Colonel Jack*, *Roxana*, and *Journal of the Plague Year*—the last being a masterpiece of realism—and *Memoires of a Cavalier*.

DE FOREST, LEE (1873), an Amer. inventor, *b.* in Council Bluffs, Ia. In 1893 he graduated from the Mt. Hermon Boys' School, in Massachusetts, after which he studied at the Sheffield Scientific School, at Yale University. He was vice-president of the American De Forest Wireless Telegraph Co., during 1902-6, which was succeeded by the United Wireless Telegraph Co. Since 1913 he has been vice-president of the Radio Telephone Co. and the De Forest Radio Telephone & Telegraph Co. Mr. De Forest is known as one of the pioneers of wireless telegraphy and telephony in the United States and has invented many of the devices which have perfected that science. In 1919 he had taken out over 120 patents connected with radio telegraphy and telephony. His most important contribution, however, is the 'Audion,' a detector, oscillator and amplifier, by means of which trans-continental telephone communication became possible, both by wire and wireless.

DE FOREST, ROBERT WEEKS (1848), an American lawyer and philanthropist, *b.* in New York. After graduating from Yale University, in 1870, he studied law and has ever since practiced law in New York. His business interests are wide and varied, but he is better known on account of his philanthropic activities, especially in relation to housing. He was the first tenement house commissioner of New York City, in 1902-3. He is president of the Russell Sage Foundation, the National Housing Association and numerous other similar bodies.

DEGGENDORF, DECKENDORF (48° 51′ N., 12° 56′ E.), town, on Danube, Bavaria; church of Holy Sepulchre, visited annually by thousands of pilgrims; depot for timber trade of Bavarian forest. Pop. 7,500.

DE GOGORZA, EMILIO EDUARDO (1874), an American baritone singer, *b.* in Brooklyn, N.Y., of Spanish parents. At the age of two he went abroad with his parents and was educated in France and England. He made his professional debut in this country in 1897 with Madam Sembrich's company, in the Metropolitan Opera House. Since then he has made many concert tours.

DÉGOUTTE, JEAN MARIE JOSEPH (1869), Fr. general, took part in pacification of Madagascar, 1894; at outbreak of World War was a battalion commander; for distinguished staff work was appointed Gouraud's Chief of Staff; later promoted to command of 21st Corps. In June 1918 became commander of 6th Army, with which and American forces he operated on General Mangin's right in second battle of Marne and took Château-Thierry. Took part in sweep forward into Belgium, Oct. 1918; was placed in command of Fr. army of occupation in Germany, 1919. He commanded the French forces during the seizure and occupation of the Ruhr in 1923.

DEGREES, ABBREVIATIONS OF See ABBREVIATIONS.

DE HAAS, MAURITZ (1832-95), Amer. artist; seascapes.

DEHRA (30° 20′ N., 78° 6′ E.), chief town, Dehra Dun district, United Provinces, India; military cantonment. Pop. 28,000.

DEHRA DUN (30° 30′ N., 78° E.), district, Meerut division, United Provinces, India, at foot of Mussourie Mountains (Himalayas); consists for most part of fertile valley (Dun) of Dehra; tea-gardens. Area, 1,209 sq. miles. Pop. 180,000.

DEIOCES (*c.* 699-47 B.C.), first Median king.

DEÏOTARUS (I. cent. B.C.), tetrarch of Galatia; Rom. ally against Mithradates; cause pleaded by Cicero when accused of design against Cæsar.

DEIR, DEIR-EL-ZOR (35° 20′ N., 40° 11′ E.), town, on Euphrates, Asiatic Turkey. Pop. *c.* 7,000.

DEIRA, ancient Anglian kingdom; between Humber and Tees; date of foundation unknown; united with Bernicia to form kingdom of Northumbria in VII. cent.

DEISM (Lat. *deus*, god), system of natural religion evolvable by reason without aid from revelation. Term *deist* was invented to distinguish a certain class of self-thinkers of XVII. and XVIII. cent's from *atheists*; etymologically it is equivalent of theist, and was considered synonymous till end of XVII. cent., but later *theists* accept certain kinds of revelation. Deism as form of rationalism is important in history of European thought, being early result of extension of outlook through scientific discoveries, Renaissance, etc. Its upholders varied in attitude towards questions of immortality, determinism, etc., but agreed in accepting God, rejecting Bible. First deists asserted pagan and eastern origin of their system, naming Confucius, the Stoics, Marcus Aurelius, Seneca, etc. The term first occurs in Bayle's *Dictionnaire*, 1695-97.

DEISTER (52° 15′ N., 9° 30′ E.), chain of hills, Hanover, Germany; coal mines, sandstone quarries.

DE KALB, a city of Illinois, in De Kalb co. It is on the Chicago, Great Western, the Chicago, Milwaukee and Gary, and the Chicago, Aurora and De Kalb railroads. It is an important industrial community and has manufactures of barbed wire, agricultural implements, pianos, shoes, etc. It is the seat of the Northern Illinois State Normal School. Pop. 1920, 7,871.

DE KALB, JOHN or JOHANN, BARON (1721-1780), a French soldier, *b.* in Huttendorf, Bavaria. His military training was acquired as an officer of the French Army and when Benjamin Franklin, in 1776, engaged him to give his services in the Continental Army, he was a brigadier-general. In the following year he came over to America with Lafayette and was commissioned a major-general by the Continental Congress. During the next two or three years he served around Philadelphia under Washington. In 1780 he was sent to relieve General Lincoln, who was besieged in Charleston. In August of that year he had command of the Maryland and Delaware troops, which, under Gates, at the disastrous Battle of Camden, stood their ground so determinedly that before the close of the engagement they alone faced Cornwallis. Here De Kalb was wounded, dying three days later from his injuries. A statue was erected in his honor in 1825 and dedicated and unveiled by Lafayette.

DE KAY, CHARLES (1848), an Amer. author and critic, *b.* in Washington, D.C. He graduated from Yale University, in 1868, and for many years was art and literary editor of the New York Times and The New York Evening Post. During 1894-7 he was American Consul-General at Berlin, Germany. Among his works are *The Bohemian*, 1878; *Vision of Nimrod*, 1881; *Life and Works of Barye, Sculptor*, 1889; *Bird Gods* (a study of myths and religions of ancient Europe), 1898; and he has translated from the German *The Family Letters of Heinrich Heine.*

DEKKER, THOMAS (*c.* 1570-1641), Eng. dramatist and pamphleteer; pamphlets include *The Wonderful Year, The Gull's Hornbook*, etc.; chief plays, *The Shoemakers' Holiday, Old Fortunatus*, and others in collaboration with Webster, Massinger, Chettle, Ford, and Middleton; writing prolific and unequal but of high emotional quality.

DE KOVEN, (HENRY LOUIS) REGINALD (1861-1920), an American composer, *b.* in Middletown, Conn. He graduated from Oxford University, England, in 1879, then studied music in Europe, returning to this country in 1882. From 1902 to 1904 he was leader of the Washington (D.C.) Symphony Orchestra, later on being musical critic on the New York World. His most popular work is the operetta *Robin Hood*, but he also composed the music of *The Begum*; *Don Quixote*; *The Fencing Master*, and *The Student King*, 1906, as well as music for piano and orchestra.

DE LA BECHE, SIR HENRY THOMAS (1796-1855), Eng. geologist; induced government to establish the Geological Survey of Great Britain (director, 1835), the Museum of Practical Geol., and Royal School of Mines; Pres. of the Geological Soc., 1847; author of *The Geological Observer* and numerous research memoirs.

DELACROIX, FERDINAND VICTOR EUGENE (1799-1863), a French painter, *b.* near Paris. He is considered the father of the modern romantic school in painting, and is noted for his remarkably rich coloring and rather weak drawing. His first canvas, *Dante and Virgil in the Infernal Regions*, was exhibited in 1822 and at once gained him a place among French painters. In 1831 he accompanied the French Embassy to the Court of Morocco, as a result of which he later produced his best paintings, Oriental scenes rich in coloring. Among these are *Algerian Ladies in their Chamber, The Jewish Marriage*, and *Moorish Soldiers at Exercise.* He was admitted to the Institute in 1857.

DELAGOA BAY, inlet of Indian Ocean, Port. E. Africa (26° S., 33° E.); rivers; S. part, sheltered by Inyak receives Tembe, Umbeluzi, and Usuti; peninsula and isl., forms harbor of Port Melville; since dredging of shifting bar of sand Lourenço Marquez can be reached by large vessels; coaling station since 1914; railways from port to Transvaal and Swaziland; bay discovered in 1502. During negotiations between Great Britain and Portugal as to the rights of the latter in East Africa, claims of the Delagoa Bay Railway Company for the seizure of the line by Portugal in 1899 were brought forward. After arbitration the decision was made against Portugal and damages of over $3,000,000 were awarded. By a compromise made in 1900 American claimants who had an interest in the line were awarded $500,000.

DELAMBRE, JEAN BAPTISTE JOSEPH (1749-1822), Fr. astronomer; pub. Tales of Uranus; prof. of Astron. at the College de France.

DE LA MARE, WALTER (1873), Eng. poet and novelist; *Poems*, 1900; *Songs of Childhood*, 1902. His novels include *Henry Brocken* and *The Return*. 1910.

DELAND, ELLEN DOUGLAS (1860), an American author, *b.* Lake Mahopac, N.Y. She was educated privately in New York City. Among her books are *Josephine, a Little Son of Sunshine*, 1906; *Country Cousins*, 1913, and *The Secret Stairs*, 1921.

DELAND, MARGARETTA WADE (1857), an American author, *b.* in Allegheny, Pa. Her education was acquired in private schools. In 1880 she married Lorin F. Deland, of Boston. Her books, largely novels of American life, have gained her a wide popularity and by many she is regarded as one of the best representatives of American fiction. Her *Old Chester Tales* especially gained her recognition from the critics. Among the most widely read of her books are *Dr. Lavendar's People*; *The Awakening of Helena Richie*, 1906; *The Iron Woman*, 1911; *The Hands of Esau*, 1914; *Around Old Chester*, 1915; *The Rising Tide*, 1916, and *The Vehement Flame*, 1922.

DELANE, JOHN THADDEUS (1817-79), Eng. journalist; editor of *The Times* 1841-77.

DELANO, FRANCIS HENRY (1848), a rear-admiral U.S.N., *b.* at Mt. Carmel, Ohio, son of Henry Franklin and Maria Carter Delano. After graduating from the United States Naval Academy in 1867 he served on various duties and stations including the command of the Fish Hawk of the North Atlantic Fleet from 1896 to 1898 and captain of yard, navy yard, League Island, Pa., in 1902 and after advancing through various grades was made a rear admiral in 1905. He was assigned to court martial duty in 1903 and served as commanding officer of the receiving ship Lancaster until 1905 when he retired at his own request.

DELANO, FREDERIC ADRIAN (1863), an American engineer and expert on railroad management, *b.* in Hong Kong, China. He graduated from Harvard University, in 1885, and soon after went into the railroad business. In 1905 he entered the service of the Government as consulting expert for the War Department in the Philippines. During 1912-14 he was a member of the Commission on Industrial Relations, and for six years he was a member of the Federal Reserve Board. During the war against Germany he served in France as assistant to Gen. Atterbury, who was Director-General of Transportation at Tours. He was appointed receiver for the Supreme Court of the U.S. in the Red River Boundary case. between Oklahoma and Texas.

DELANY, MARY GRANVILLE (1700-88), Eng. writer; wrote chatty *Autobiography*, but chiefly known for friendship with Swift, Burke, and Fanny Burney.

DE LA REY (or DELAREY), JAKOBUS HERKLAAS (1847-1914), Boer leader; during S. African War, 1899-1902 achieved a long series of successes.

DE LA RIVE, AUGUSTE ARTHUR (1801-73), Swiss physicist; app. prof. of Physics at Geneva, at age of twenty-two; investigated various electrical phenomena, and invented method of galvanizing.

DELAROCHE, PAUL (1797-1856), Fr. artist of *Eclectic school*; among his Eng. and Fr. hist. subjects are *Cromwell at the Coffin of Charles I.*, *The Princes in the Tower*, *Execution of Lady Jane Grey*.

DE LA RUE, WARREN (1815-89), Brit. chemist and astronomer; invented photoheliograph.

DELAVIGNE, JEAN FRANÇOIS CASIMIR (1793-1843), Fr. dramatist and poet, author of *Les Vepres Siciliennes*, 1818; *Les Enfants d'Edouard*, 1833; *Louis XI.*, 1832.

DELAWARE, state, U.S. (38° 28′ - 39° 50′ N., 75° - 75° 46′ W.), bounded N. by Pennsylvania, W. and S. by Maryland, E. by Delaware R., bay, and Atlantic; the smallest state except Rhode Island; cap. Dover. Delaware is situated on plain on peninsula formed by Chesapeake Bay and Delaware R.; surface mostly flat and level; shores sandy and marshy, with many creeks and bays; some parts reclaimed from sea by dykes. The N. beautiful, fertile district, with rolling hills and deep valleys. Long ridge running N. and S. forms watershed of state. The S. is almost flat, and some parts swampy. Rivers, small but navigable, include Brandywine, Christiana, Duck, and Murderkill; canal connects Delaware R. with Chesapeake Bay. See MAP, U. S.

General assembly is senate of 17 elected for four years and house of representatives of 35 members elected for two years. Delaware Coll. is in Newark; also agricultural coll. in Dover for colored people.

Principal harbors are Wilmington, Newcastle, and Lewes. Other towns are Smyrna, Delaware city, Milford, Laurel, Seaford, and Georgetown; Wilmington also a rising manufacturing town and railway center. Granite clays and kaolin are to be found in N., but state is chiefly agricultural. Principal productions are fruits (especially peaches, strawberries, and other small fruits) and grain; market gardening, dairy farming, stock raising, and oyster fishing carried on; forests supply fine timber. Various manufactures, including iron and steel products, ships, leather goods, cottons, flour, and paper. Area, 2,370 sq. m., of which 405 sq. miles water; pop. 1920, 223,003.

Delaware has its name from Lord de la Warr, governor of Virginia in 1611. Settled first by Swedes and Finns under Peter Minuit, who built Fort Christiana in 1638 and named the county New Sweden, D. passed into the hands of the Dutch in 1655, and nine years later was surrendered, together with New Amsterdam (New York), to the English. In 1682 William Penn obtained proprietary rights in the state, which finally procured a constitution in 1776. Although a slave state up to 1861, D. was not in favor of secession, and sent many men to join the ranks of Lincoln.

DELAWARE, a city of Ohio, in Delaware co., of which it is the county seat. It is on the Big Four, the Pennsylvania Company, and other railroads, and on the Olentangy River, 24 miles N. of Columbus. It is the trade center for several counties and has manufactures of iron, flour, woolen goods, furniture, agricultural implements, etc. In the neighborhood are sulphur, magnesia and other mineral springs. Delaware is the seat of the Ohio Wesleyan University. It has several hotels, and two banks. Pop. 1920, 8,756.

DELAWARE BAY, an arm of the Atlantic Ocean which penetrates between the states of Delaware and New Jersey. At the entrance near Cape Henlopen is the Delaware breakwater erected by the Federal Government, which affords vessels a shelter within the cape.

DELAWARE COLLEGE, a state institution founded in 1833, in Newark, Dela., closed in 1859 and re-opened in 1870 as a 'land grant institution.' In 1887 an experimental station was established with it. In 1897 it began receiving $40,000 a year from the state, and in 1913 it received the first installment of a grant from the legislature amounting to $150,000 for the purpose of erecting the buildings for a woman's college. In 1921-22 it had a faculty of 31 and 232 students.

DELAWARE INDIANS, a tribe of Indians also known as the Lenapes, of the Algonquin branch, which occupied the valleys of the Delaware and Schuylkill Rivers in the early part of the 16th cent. After the rise of the Iroquois they removed to the banks of the Susquehanna, where they were friendly with the English and made several treaties both with them and the American government. With the settlement of the East they journeyed westward and finally removed, in 1870, to a reservation in the Indian Territory. They were later incorporated with the Cherokees.

DELAWARE RIVER, a river of the U.S. which has its rise in the Catskill Mountains of New York. It is the dividing line between Pennsylvania, New York, New Jersey and Delaware. After a course of about 300 miles it empties into Delaware Bay. It is navigable for large vessels to Philadelphia, and for smaller vessels to Trenton at the head of tidewater, 154 miles.

DELBRÜCK, HANS (1848), Ger. historian; his most notable work is a glorification of war; editor of *Preussische-Jahrbucher* (Prussian Monthly Review); when the issue of the war was going against Germany, was in favor of peace without annexations.

DELCASSÉ, THÉOPHILE (1852-1923), Fr. statesman; colonial minister, 1894; composed the Fashoda affair, 1898; minister for foreign affairs, 1898-1905; difficulties between France and Germany over Morocco led to his retirement; minister of marine, 1911; ambassador at Petrograd, 1913-14; again minister for foreign affairs, Aug. 1914-15.

DELFT (52° 1′ N., 4° 22′ E.), town, S. Holland; noteworthy buildings, Prinsenhof (now museum; former residence of Counts of Orange and scene of assassination of William the Silent, 1584); town hall; Old Church (XI. cent.); New Church (1381); birthplace of Grotius (1583); in XVII. and XVIII. cent's D. was famous for pottery—'Delft Ware,' and the industry is now revived, the modern product being termed 'New Delft.' Pop. 1920, 39,539.

DELHI, seat of government of India, imperial enclave (557 sq. m.), Meerut dist., United Provinces, India (28° 40′ N., 77° 12′ E.), on r. bk. of Jumna. There have been many Delhis, the earliest dating from 1052; in the 12th cent. cap. of Mogul Empire; existing Delhi surrounded by wall 5¼ m. in circumference. Captured by French, and taken from them by Lord Lake in 1803. During Mutiny headquarters of the rebels. 'The Ridge' with its monuments and the battered Kashmir gate recall siege of nearly four months and capture of the city by the British in 1857. Famous palace of Shah Jehan; Jama Masjid (Great Mosque), Kala Masjid (Black Mosque), tombs of imperial family (in the suburbs); Kutab-Minar, wonderfully built tower, surrounded by miles of ruins. Principal street Chandi Chouk (Silver Street); many fine modern buildings; public gardens; bazaars famous for shawls, precious stones, gold and silver ware; important center of wheat trade; has many cotton mills. Pop. 487,000.

The New Capital.—Announcement made at Delhi Durbar, Dec. 1911, when King-Emperor George V. laid the foundation stone.

DELIAN CONFEDERACY.—(1) Alliance of Ionian states of *Magna Graecia* against Persia, 478 B.C.; named after meeting-place of executive council at Delos; almost unique effort of autonomous Gk. states at federation. Necessity of union against Persia was perceived by Athens alone, who incurred Persian invasion by aiding Gk. cities of Asia Minor; result was great Persian defeat at *Marathon*, 490, and gratitude of Ionians, which enabled Athens to establish and control confederacy. Athens divided Ægean into taxation districts of Hellespont, Thrace, Ionia, Caria, and islands. With removal of treasury from Delos to Athens pretense of confederacy came to end.

DELIBES, CLEMENT PHILIBERT LÉO (1836-91), Fr. composer; best opera, *Lakme*; ballets include *Sylvia* and *Coppelia*.

DELILAH, Philistine woman who betrayed Samson to his enemies (*Judges* 16).

DELIRIUM, a temporary derangement of the brain, usually a complication of some disease, (*e.g.*) brain injury, fevers, poisoning.

DELIRIUM TREMENS. See ALCOHOLISM.

DELISLE, JOSEPH NICOLAS (1688-1768), Fr. astronomer; founded the observatory in St. Petersburg; app. naval astronomer in Paris; discovered a method for calculating the transit of Mercury and Venus; pub. numerous research papers.

DELITZSCH (51° 33′ N., 12° 20′ E.), town, on Lober, Saxony, Germany; tobacco, woolens. Pop. 11,000.

DELITZSCH, FRANZ (1813-90), Ger.-Hebrew divine of Lutheran persuasion; author of many theological works, and regarded as one of founders of Higher Criticism.

DELLA ROBBIA, LUCA (1399-1482), Ital. sculptor; much of it done for cathedral at Florence; held very high position in Florentine art, and his relief work gave name to a style known as 'Della Robbia ware.'

DELLENBAUGH, FREDERICK SAMUEL (1853), an American artist and author, *b.* at McConnelsville, Ohio, *s.* of Samuel and Elizabeth Smith Dellenbaugh. He was educated at Buffalo, N.Y. and later studied in Paris and Munich. In addition to making several expeditions to the Southwest in the early days, he was with Major Powell's 2nd expedition down the Colorado River, 1871-3, as artist and topographer, was with the Harriman expedition to Alaska and Siberia in 1899 and made voyages to Iceland, Spitzbergen, Norway, West Indies and South America. Besides contributions to magazines and to Sturgis' Dictionary of Architecture on American Aboriginal Buildings he was the author of *The North Americans of Yesterday*, 1900; *The Romance of the Colorado River*, 1903; *Breaking the Wilderness*, 1905; *Life of General George A. Custer*, 1916, and others.

DELMENHORST (53° 3′ N., 8° 38′ E.), town, grand-duchy of Oldenburg, Germany; woolen factories. Pop. 22,000.

DELONEY, THOMAS, Eng. ballad-writer and silk-weaver, who, during Elizabeth's reign, wrote numerous popular broadsides on the Armada, and other national subjects.

DE LONG, GEORGE WASHINGTON (1844-81), an American explorer, native of New York. He took part in a relief expedition to the Arctic, where Charles Francis Hall was exploring Melville Bay, 1873. In 1879 he commanded the *Jeannette* on a Polar expedition, when in 1881 the ship foundered, and after months of hardship he succumbed in Northern Siberia.

DELORME, MARION (1613-50), Fr. courtesan; famed for wit and beauty; life dealt with by Hugo, de Vigny, and G. P. R. James.

DE L'ORME, PHILIBERT (*d.* 1570), Fr. architect; one of architects of the Tuileries; largely employed by Valois kings.

DELOS, LITTLE DELOS (37° 24′ N., 25° 17′ E.), island, smallest of Cyclades group, in Ægean Sea; birthplace and seat of worship of Apollo ('Delois') and Artemis ('Delia'); believed to have been inhabited by Ionians; later in possession of Athens. After fall of Corinth, 146 B.C., D. became center of commerce, and had large slave-trade; noted for art, especially bronze works. City of Delos was situated on W. of island; contained temple of Leto, besides Great Temple and oracle of Apollo. D. was protected by sanctity; there was no need of fortifications; continued to flourish till destroyed, 87 B.C. during Mithridatic war. Here was kept the treasury of the *Delian Confederacy* (*q.v.*); interesting Fr. excavations since 1876.

DELPHI (38° 29′ N., 22° 30′ E.), small town (originally called *Pytho*; modern *Castri*), in Phocis, Greece; famous for oracle of Apollo, in charge of Pythian priestess; situated on steep slope on S. side of Mt. Parnassus; shut in on N. by mts. Name is derived, either from eponymous hero, Delphus, or from *Adelphos* (brother), referring to twin-peaks near by, between which issued Castalian spring. D. was governed by several aristocratic families of Doric origin, from which were chosen magistrates, priests, etc.; principal place of worship for Apollo, whose temple stood in N.W. of town; first built of stone; burnt in 548 B.C., and rebuilt with marble front. Its marvelous store of wealth tempted Xerxes, whose attempt at possession, however, was repelled; plundered, 350 B.C. by Phocians to carry on war against Thebes; robbed later by Sulla, Nero, and others.

DELPHINIA, Athenian festival in honor of Apollo, held yearly in April.

DELPHINUS, constellation of N. hemisphere, known to the ancients.

DELPHOS, a city of Ohio, in Allen and Van Wert counties. It is on the Pennsylvania Company, the Toledo, St. Louis and Western, the Cincinnati, Hamilton and Dayton, and other railroads, and on the Miami and Erie Canal. Its industries include railroad shops, granite works, flour and paper mills. It has also manufactures of iron products, printing presses and furniture. Pop. 1920, 5,745.

DEL RIO, a city of Texas, in Val Verde co., of which it is the county seat. It is on the Galveston, Harrisburg and San Antonio Railroad. Its industrial establishments include cotton gins and it is the center of an important agricultural and livestock region. It has a hospital, two convents, and a Federal building. Here is the famous San Felipe mineral spring. Pop. 1920, 10,589.

DE LUCA, GUISEPPE (1876), an Italian baritone, *b.* at Rome, Italy, *s.* of Nicola and Lucia De Filippi De Luca. He was educated at Tech. Inst., Rome and Royal Academy of St. Cecelia, Rome. After making his debut as Valentin in 'Faust' at Piacenza, Italy, in 1897 he spent eight seasons at the La Scala Theatre, Milan and appeared in the capitals of Europe. In 1915 he made his American debut at the Metropolitan Opera House as Figaro in 'Barber of Seville' and achieved immediate popularity. He afterwards sang principal roles in Rigoletto, Don Giovanni, Don Carlos, Hamlet, Tannhauser and other operas.

DELVILLE WOOD, N.E. of Longueval, dep. Somme, France (50° 2′ N., 2° 50′ E.), 5 m. S. by W. of Bapaume; scene of terrific fighting in 1915-16. See SOMME, BATTLES OF THE.

DELSARTE, FRANÇOIS ALEXANDRE NICOLAS CHERI (1811-71), Fr.-Amer. first operatic tenor, and then teacher of system of dramatic expression.

DELTA (from shape of Gk. letter), any tract of land enclosed by branches of a river's mouth (*e.g.* Ganges, Nile, Mississippi, Danube); the triangular tract of land is formed by deposits of fine silt brought down by the river.

DELTOID. See MUSCLES.

DELUC, JEAN ANDRÉ (1727-1817), Swiss geologist and natural philosopher; emigrated to England; F.R.S., 1773; pub. memoirs on atmospheric moisture, geol., and on philosophy.

DELUGE, THE, name given to the flood which overwhelmed the world, because of the wickedness therein, as related in *Genesis* (vi.-ix.). This Biblical story, which is supposed to be founded on the Babylonian tradition, contains several inconsistencies, and is admittedly of a composite character. Indeed, flood stories are to be found in all primitive religions and traditions—notable instances being that set forth in Ind. epic, *Mahabharata*, and the story of *Deucalion* (Ovid's *Metamorphoses*). The Eng. Bible dates the D. at 2348 B.C.

DELYANNI, THEODORUS (1826-1905), Gk. diplomatist and prime minister; great opponent of Tricoupi; equipped army against Turkey, 1885; fell, 1897, after failure of anti-Turk. ministry.

DEMADES (*d.* 318 B.C.), famous Athenian orator; opponent of Demosthenes; put to death.

DEMAND AND SUPPLY. See Economics.

DEMERARA (6° 15′ N., 58° 27′ W.), county of Brit. Guinea, between Essequibo and Demerara Rivers. Pop. 171,000.

DEMARATUS (*c.* 520 B.C.), king of Sparta.

DEMAREST, WILLIAM HENRY STEELE (1863), an American college president, *b.* in Hudson, N.Y. He was graduated from Rutgers College in 1883, and from the New Brunswick (N.J.) Theological Seminary, in 1888, after which he was ordained a minister of the Reformed Church. Until 1897 he was pastor at Walden, N.Y., then at Catskill, N.Y., during 1897-1901. For five years following he was professor of church history at the New Brunswick Theological Seminary. Since 1906 he has been president of Rutgers College.

DEMENTIA. See Insanity.

DEMETER (classical myth.), dau. of Cronus and Rhea; eventually assumed her mother's attributes and functions, and became recognized as goddess of the earth's fruitfulness. She is generally represented as a woman of majestic appearance, with flowing yellow hair, emblematical of ripened corn.

DEMETRIUS (IV. cent. B.C.), Gk. sculptor, famed for realism.

DEMETRIUS (*c.* 206 B.C.), king of Bactria.

DEMETRIUS, name of two Macedonian kings.—Demetrius I. (337-283 B.C.), the 'besieger,' established supremacy over Greece and Macedonia, seizing throne, 294; *d.* a prisoner during attempted conquest of Asia.—Rule of Demetrius II. (239-29), marked by first Rom. interference.

DEMETRIUS, name of 3 Syrian kings. —Demetrius I., Soter (*fl.* 162-50 B.C.); Demetrius II., Nicator (*fl.* 147-25 B.C.); Demetrius III. (*d.* 88 B.C.).

DEMETRIUS PHALEREUS (345-283 B.C.), Gk. philosopher and statesman.

DEMETRIUS, PSEUDO, name given to three Pretenders who claimed to be Demetrius, the heir to the Russ. empire, murdered in 1591. The first defeated army of reigning Czar, was crowned at Moscow 1605, but murdered, 1606; the second won great successes, failed in attack on capital, and was murdered, 1610; the third was captured and executed, 1612.

DE MILLE, CECIL BLOUNT (1881) an American producer of motion pictures, son of Henry C. and Beatrice Mathilde Samuels De Mille. He was educated in public schools. He was an actor, playwright and theatrical producer for ten years during which time he produced a number of successful plays for David Belasco. In 1914 he engaged in the motion picture business and was afterwards director general of Jesse L. Lasky Feature Play Co., Inc.; president of the Moresco Photoplay Co.; vice president of the Pallas Picture Co.; director general of the Famous Players-Lasky Co. and president of the Mercury Aviation Co.

DE MILLE, WILLIAM CHURCHILL (1878), an American playwright, *b.* in Washington, N.C. He graduated from Columbia University, in 1900, taking a post graduate course during the following two years. Until 1914 he was one of David Belasco's managers; after that date he became connected with the motion picture industry, being director-general of the Jesse L. Lasky Feature Play Co., president of the Morosco Photoplay Co. and director-general of the Famous Players-Lasky Co. Among his productions are *The Girl of the Golden West*; *The Dream Girl*; *The Whispering Chorus*; *Something to Think About*; *The Affairs of Anatol* and *Fool's Paradise.*

DEMING, EDWIN WILLARD (1860), an American artist, *b.* at Ashland, Ohio, *s.* of Howard and Celestia Velutia Willard Deming. After being educated in public and private schools he studied at the Art Students League and also under Boulanger and Letchyre, Paris. In addition to painting Indian and animal subjects he was also a sculptor and mural decorator and received several medals for his work. He is permanently represented in the Wisconsin Historical Society, the Metropolitan Museum of Art and the American Museum of Natural History. He was senior officer of the camouflage department of the Infantry School of Arms, Camp Benning, Ga., with the rank of captain, U.S.A.

DEMISE, term commonly used for death, but the correct meaning is transfer of estate. *D. of the Crown* is its transfer to a successor without any interregnum ('The king is dead: long live the king'). Formerly anarchy theoretically obtained between the death of the sovereign and the proclamation of his successor.

DEMIURGE (Gk. *demos*, 'people,' and *ergon*, 'work'), among the Gnostics the creator of the world of sense, as distinguished from the higher God, the creator of the divine soul, identified with the Jehovah of the Old Testament. See GNOSTICISM.

DEMMIN (53° 54′ N., 13° 1′ E.), town, Prussia, Germany; iron foundries; trade in grain, wool, coal, and timber. Pop. 12,500.

DEMOCHARES (*d.* 275 B.C.), Athenian statesman; nephew of Demosthenes.

DEMOCRACY, government by the people, is opposed to autocracy or oligarchy. With Aristotle d. was *bad* government by the people. Gk. d., which excluded slaves, had no representative government; the citizens met, spoke, and voted. In Gk. and Rom. cities there were continual struggles between lower and upper classes. Ancient d. was local; modern d. governs countries.

DEMOCRATIC PARTY, THE. To the Anti-Federalists who were opposed to the adoption of a Federal constitution the term 'Democratic' was often applied in 1789-1792, and from the last decade of the 17th to about the second decade of the 19th century they were called Republicans. The Anti-Federalist Republicans had heartily adopted French political ideas. They were opposed to strong government centralization, favoring the limitation of its power, while that of the States should be supreme. In 1798 Jefferson and Madison in resolutions in Kentucky and Virginia formulated the Democratic position. After that the Anti-Federalists gave way to two groups, the National Republicans, or Whigs, and the Democratic Republicans. Andrew Jackson (*q.v.*) was the organizer of the Democrats who because of the strong southern wing declared for slaves, and represented the conservatives, while the Republicans were for progress, free men, and free soil. Except in 1840-1844 and 1848-1852, the Democrats were in power until 1860. The party was then divided into two branches. The South favored the limitation of Federal power lest it might be extended to interfere with slavery. The western branch had little sympathy with slavery and thought the south too aristocratic, but they both wanted popular control of the central government and were against protection and a national bank. In 1860 the southern branch attempted to extend slavery and disrupted the party. The Civil War widened the gap between the Democrats and Republicans, for the Democrats sided with the secessionists. The rush of aliens to the United States after the war greatly strengthened the Republicans, for the new-comers declared for the party which was for freedom and against slavery. To mend their fallen fortunes the Democrats in 1872 endorsed Horace Greeley (*q.v.*) for President and the Liberal Republican party, but were badly beaten. In 1876 their candidate Samuel J. Tilden (*q.v.*) had a popular majority of 250,000, and apparently a majority in the electoral College. Hayes, his opponent, was seated because some Electoral votes for Tilden were thrown out as fraudulent. In 1884 and 1892 Cleveland was President, but all through the '80's and '90's, there was widespread discontent, owing to industrial and agricultural depression due it was largely believed, to the monetary system. These conditions led to a radical movement which brought about the nomination of W. J. Bryan in 1896 who declared for free coinage of silver, and denounced 'government by injunction.' The conservative wing of the Democrats held a separate convention, nominating J. M. Palmer, with the old style platform. The Bryanites, even with the help of the Peoples Party (*q.v.*) only obtained 176 votes out of 447. In 1900 Bryan ran again on the same platform with 'Imperialism' added, and received 155 votes. In 1904 the conservatives got control. Judge Alton Parker ran, receiving 140 votes out of 475. Bryan was nominated a third time in 1908 and got 162 votes to Taft's 321. In 1912 the division of the Republican party as the result of the revolt of the progressive element and the formation of the Progressive party which nominated Theodore Roosevelt for president, divided the Republican party. The regular organization re-nominated President Taft, while the Democrats nominated Woodrow Wilson. In the election of this year, Wilson received 435 electoral votes, Roosevelt 88, and Taft 8. Thus the Democratic power was in control of the government during the first years of the World War. In 1916 President Wilson was renominated while the Republicans nominated Charles E. Hughes. The election was extremely close and was undecided for several days. The final count gave to President Wilson 277 electoral votes and to Mr. Hughes 254. In 1920 the Democratic party suffered from the effects of the war and general dissatisfaction with economic and political conditions following it. James M. Cox, of Ohio, was nominated by the Democratic party, and Senator Warren G. Harding of Ohio, by the Republicans. The election gave to Harding the largest plurality ever recorded in the history of the country, over 7,000,000 votes, while he received 404 electoral votes to 127 for Cox. The election also gave the Republican party a strong majority in both houses of

Congress. The Congressional elections in 1922 indicated that the Democrats had recovered, to a considerable extent, the losses suffered in 1920. The Republican majority in both houses of Congress was materially reduced and a preponderance of Democratic governors was elected.

DEMOCRITUS (*b. c.* 460 B.C.), one of the greatest Gk. philosophers; anticipated theory of matter (*i.e.*) matter is composed of atoms which are always in motion; held that all atoms were alike, only by arrangement and position could they form different objects, hence objects did not vary, but their varied appearances were due to our sensations.

DEMONOLOGY, the belief in demons and study connected therewith. In many religions there have been not only good gods whose favor it was desirable to obtain, but bad gods or spirits to be mollified. The Jews inherited from ancient Semitic religion a belief in demons to which we find occasional reference in the Bible, but during the Exile they came into contact with Persian religion in which angels and demons played a prominent part. The phenomenon (whether real or supposed) of possession by an evil spirit is familiar to every reader of the New Testament, and persons at any rate believed themselves possessed. The Early Christians did not deny the existence of pagan gods, but transformed them into devils. Demons were not prominent in either Gk. or Rom. religions, but in Oriental religions devil-worship takes uncouth and sometimes cruel forms.

DE MORGAN, AUGUSTUS (1806-71), Eng. mathematician and logician; on establishment of London Univ. 1828, became prof. of Math's there, and, with exception of short break, served the Univ. for over 30 years. He wrote *Formal Logic*; Elements of: *Arithmetic, Algebra, Trigonometry*; Treatises on *Differential and Integral Calculus.*

DE MORGAN, WILLIAM FREND (1839-1917), Eng. novelist. Pub. his first novel, *Joseph Vance*, 1906, when sixty-six—a long and leisurely book reminiscent of Dickens and containing in the elder Vance one of the most humorous figures in Eng. literature. Other novels: *Alice-for-Short*, 1907; *Somehow Good*, 1908; *It Never can Happen Again*, 1909; *When Ghost meets Ghost*, 1914; *An Affair of Dishonor*, 1910; *A Likely Story*, 1911.

DEMOSTHENES (*c.* 384-22 B.C.), Gk. statesman and orator. Early left an orphan, D. had a small fortune from his *f.*, but his guardians made away with most of it. He studied law, and devoted all his energies to becoming a good public speaker, at first being very bad and meeting with derision. He entered political life in 355, and henceforward devoted himself to his life's work of trying to revive the best spirit and traditions of Gk. life. D. believed that Athens was the rightful leader of Greece, and it was her mission to play this part not merely in her own interest, but in that of Greece as a whole. Philip, king of Macedon, in opposition to whom D. tried to stir up his fellow-citizens, was for him a type of what was not Gk. but barbarian. D. delivered his *First Philippic* and the three *Olynthiac Orations*, while Philip was still a foreign foe outside Greece, his *Second* and *Third Philippic* when Philip was a power in Greece itself. This last speech has been spoken of as D.'s 'crowning effort.' From 338 to 322 D. worked loyally for Athens in her internal affairs. His speech *On the Crown* is the greatest of this period. In the political troubles after the death of Alexander the Great, D. was condemned to death. He fled to Ægina and then to Calauria, and committed suicide by taking poison.

DEMOTICA (41° 22′ N., 26° 30′ E.), town, Rumelia; important in Middle Ages as chief market of Thrace; linen, pottery, silk, and grain exported. Pop. 9,000.

DEMPSTER, THOMAS (1579-1625), Scot. historian and scholar; prof. of Classics at Bologna; author of *Historia Ecclestica Gentis Scotorum.*

DEMURRAGE, payment made by shipper of goods to shipowner as compensation for delay in loading or unloading a vessel; a charge made by railway companies for delay in removing goods from their wagons.

DEMURRER, in law, preliminary protest made by defendant to the effect that plaintiff had no proper cause for action.

DENAIN (50° 20′ N., 3° 25′ E.), town, Nord, France; coal mines and ironworks; scene of Villars' victory over Prince Eugène, 1712. Pop. 25,000.

DENATURED ALCOHOL. Ethyl alcohol containing impurities which, according to the definition given in the Act of Congress of June 7th, 1906, 'destroy its character as a beverage or render it impure for liquid medicinal purposes.' It will be seen that this definition covers any substance which renders the alcohol distasteful, nauseous or poisonous, but all denatured alcohol offered for sale must have been mixed with a denaturant, or mixture of denaturants, which have received governmental approval. There are two classes of denatured alcohol, one known as 'completely denatured,' the other as 'specially denatured,' and the government issues a bulletin giving a number of denaturing formulæ which are permitted. Six formulæ are given for completely denatured alcohol, and forty-one for specially denatured. Completely denatured alcohol may be used for all purposes, but specially denatured may only be used in certain authorized industries, each of the forty-one formulæ being restricted to specific industries. Completely denatured alcohol contains substances which render it unfit for certain manufacturing purposes, and so from time to time special denaturants have been suggested to and approved by the government, these denaturants, while rendering the alcohol unfit for beverage purposes, being of such a character that they do not interfere with the manufacturing process. The denaturants for completely denatured alcohol include wood alcohol, benzine, pyridine, ether, aniline, nitrotoluene and pine oil. Special denaturants include a great number of substances. As an example, formula No. 13 A. may be quoted, which calls for the addition of 10 gallons of sulphuric ether to every 100 gallons of alcohol. This formula is permitted for the manufacture of anæsthetic ether and other chemical preparations. Permits to use alcohol containing special denaturants are given only after careful investigation of the applicant. Instructions following the above formula read: 'Internal revenue officers are hereby instructed to exercise great caution in recommending the granting of permits for the use of this formula. A very careful and close surveillance of such factories must be maintained.'

DENBIGH (53° 12′ N., 3° 25′ W.), county town, Denbighshire, N. Wales; ruined XIII.-cent. castle; timber, shoes. Pop. 7,000.

DENBIGH, WILLIAM FIELDING, 1ST EARL OF (*c.* 1582-1643), Eng. Royalist; of family wrongly supposed to be descended from Hapsburgs; cr. Earl of D., 1622.

DENBIGHSHIRE (53° 10′ N., 3° 30′ W.), maritime county, Wales, having Irish Sea on N., the Conway forming W., and Dee part of E. boundary; rich in coal, lead, slate, limestone, and freestone; collieries and extensive ironworks; woolen manufactures. County town is Denbigh; other towns, Wrexham, Ruthin. Area, 665 sq. miles. Pop. 155,000.

DENBY, EDWIN (1870), Secretary of the U.S. Navy Department, *b.* in Evansville, Ind. Graduating from the University of Michigan, he began to practice law in Detroit, Mich., in 1896. In 1903 he was elected to the House of Representatives of Michigan, and from 1905 to 1911 he was a member of Congress, from the 1st Michigan District. He served in the Spanish-American War in the Navy, and in 1917 entered as a private in the Marine Corps. He rose to the rank of major. In 1920 he was appointed chief probation officer of the Recorder's Court, City of Detroit, and in 1921 he became Secretary of the Navy in President Harding's Cabinet.

DENDERA (26° 13′ N., 32° 40′ E.), village, on Nile, Upper Egypt; has celebrated temple of Hathor, dating from period of later Ptolemies, one of most magnificent and best-preserved remains of antiquity in Egypt; D. is the ancient *Tentyra*.

DENGUE, infectious fever usually occurring in India, Africa, and tropical America; the onset is sudden, and the fever is characterized by an eruption resembling that of scarlatina.

DENHAM, SIR JOHN (1615-68), Eng. poet; author of *Cooper's Hill*, 1642, and a fine elegy on Cowley.

DÉNIA (38° 53′ N., 0° 5′ E.), seaport, on Mediterranean, Alicante, Spain; interesting Moorish relics; exports grapes, raisins, onions. Pop. 12,500.

DENIKIN, GENERAL, Russian soldier; chief of general staff with Alexeieff and Brussilov; commander-in-chief of the western front, where he replaced Gourko, June 21, 1917; commander-in-chief on S.W. front when Kornilov advanced against Kerensky, Sept. 1917; following death of Kornilov took over command of the volunteer force, which on March 26, 1918, had captured Kuban; short of ammunition, decided to retire to Don, but returned to Kuban, and by Oct. his forces had risen to 100,000. In Feb. 1919 he took the offensive, and by Nov. had established a fighting front from which he could advance into Russia. He was completely defeated in February 1920, by the Soviet Army.

DENILIQUIN (35° 33′ S., 145° 6′ E.), town, N.S. Wales, Australia; pastoral district.

DENIS, ST. (III. cent.), short for Dionysius, believed to have been martyred in Decian persecution; patron saint of France; first bp. of Paris; evangelized Gauls.

DENISON, a city of Texas, in Grayson co. It is on the Missouri, Kansas and Texas, the Texas and Pacific and other railroads, 106 miles N. of Dallas. It is the center of the cattle industry and of an important farming region. It has manufactures of cotton, cottonseed oil, iron, and creosote. Pop. 1920, 17,065.

DENISON UNIVERSITY, a Baptist institution in Granville, O., founded in 1831 as a manual training school. Later its character was changed and it became the Granville Literary and Theological Institute. Theology was dropped as a subject and in 1856 it assumed its present name. With it is affiliated the Shepardson College for Women, founded in 1887. In 1922-23 it had a student body of 896 and a faculty of 58, its president being C. W. Chamberlain.

DENISON, GEORGE TAYLOR (1839), Canadian publicist and colonel; has seen much active service; wrote *History of Cavalry*, 1877; *Soldiering in Canada*, 1900; *The Struggle for Imperial Unity*, 1909; *Recollections of a Police Magistrate*, 1920.

DENIZLI (37° 49′ N., 29° 2′ E.), town, Asia Minor, near ruins of Laodicea; cotton fabrics.

DENMAN, THOMAS, 1ST BARON (1779-1854), Eng. judge and politician; defended Queen Caroline, 1820.

DENMARK, kingdom, N. Europe (54° 34′ - 57° 45′ N., 8° 5′ - 12° 35′ E.), is partly mainland, partly archipelago. The mainland part, Jutland, is the N. part of the long peninsula extending N.W. of Germany, between the North Sea and the Baltic, the S. part being occupied by Schleswig and Holstein. It is divided from Norway by the Skager-Rack, from Sweden by the Kattegat and the Sound. The larger islands are Zealand and Fünen, the smaller Langeland, Laaland, Falster, Möen, and, 90 m. to the E., Bornholm. The surface is generally low, and in places is protected by dykes; many lakes. The climate is temperate and damp; about half of the country is in pasture, most of the remaining available land being arable; chief crops, wheat, rye, barley, oats, potatoes, sugar beet; beech flourishes better than anywhere else in Europe. Industries include distilling, brewing, sugar refining, and margarine making.

The principal exports are butter, eggs, pork, bacon, besides sheep, hides, wool, cereals, fish, margarine. The enormous amount of dairy produce is obtained largely by the co-operative butter factories and excellent methods of preservation. Imports include coal, manufactured goods, and raw products.

The W. coast is largely useless owing to the shallow sea; the rapidly-growing port of Esbjerg, however, is on that side; the more important ports are on the E. There are 2,645 m. of railway (largely owned by the state) connected by steamboats or in winter by iceboats, etc.

History.—In early 9th cent. the semi-mythical Norwegian dynasty of the Ynglinger was ruling over Denmark, and one of its members, King Harold Klak, was baptized, with many of his nobles, at Ingelheim in 826. The pagan Gorm the Old (*d.* 936) expelled this dynasty; but his son, King Harold Bluetooth, accepted Christianity in 960.

Harold's son, Sweyn I., conquered England in 1013; Sweyn's son Canute (or Cnut) the Great (1014-35) ruled over England, Norway, and Denmark, and was the most powerful monarch of his time. Denmark finally lost England in 1042. Canute's sister's son, Svend Estridsen, 1047-76, succeeded in founding the dynasty of the Ulfinger, who ruled for four centuries. Valdemar I. 1157-82, and Canute VI. 1182-1201, defeated the Wends, acquired Rugen, and again reduced Norway. Valdemar II. 1202-41, ruled over the N. almost as Canute the Great had done. After his death, 1241, Denmark was torn by strife for a century. Valdemar IV., 1340-75 again established firm rule, increased the royal demesnes, and codified the laws. His famous daughter Margaret, 1375-1412, widow of Haakon VI. of Norway, ruled over Denmark and Norway, and by the Union of Calmar, 1397, persuaded Sweden to agree to the hegemony of Denmark. Her death brought the feeble Eric VII. (deposed in 1439) to the throne. After the disasters of his reign and that of his nephew, Christopher of Bavaria, 1439-48, the Rigsraad elected a descendant of Valdemar II., Christian of Oldenburg, 1448-81. Norway and Sweden chose other rulers, and the union came to an end.

The *Oldenburg Dynasty* ruled until 1863. Christian II. 1513-23, was elected ruler of Norway, and forced his rule upon Sweden. He sought to crush the nobles as the Tudors in England were doing, tried to make the Church, while still R. C., Danish and national. The result, unfortunately, was the triumph of the favor of his uncle, Frederick I. 1523-33, the long Adelsvælde (rule of the nobles) was established. Norway remained to Denmark, but Sweden was finally separated. Christian III. 1536-59, ended the revolt of the counts by capturing Copenhagen, 1536, and made Lutheranism the state religion. Christian IV. 1588-1648, was a gifted monarch, and saved Denmark in the Thirty Years' War from the aggression of Sweden, until, hampered in every way by the factious nobles, he was forced to surrender islands and provinces and open the Sound to Swed. trade, 1645. This marked the end of Dan. supremacy in the N.

In 1658 Denmark was forced to make further humiliating concessions to Sweden at Röskilde, only partially redeemed at Copenhagen, 1660. The latter treaty was largely due to the king, and in alliance with clergy and burgesses, in opposition to the nobles, the crown was able to establish in 1660 an hereditary, absolute monarchy. Despite frequent wars with Sweden, Denmark prospered until the coalition of the N. powers against Britain in the Napoleonic wars. The Brit. fleet bombarded Copenhagen in 1801 and in 1807, and confiscated the Dan. fleet until the end of the war, when Denmark, having been driven to support Napoleon, was compelled to cede Norway to Sweden. The chief fact of the 19th cent. was the loss of Schleswig-Holstein through the deep-laid schemes of Prussia. These were, in part, returned in 1920 by a vote of the people. See SCHLESWIG-HOLSTEIN.

On the death of Frederick VII., in 1863, the house of Oldenburg came to an end, and under the Treaty of London, Prince Christian of Schleswig-Holstein-Glücksborg, nominee of the powers, became Christian IX. The new Duke of Augustenborg, however, whose father had agreed to the treaty, refused to acquiesce in his own disherison, and assumed the title of Frederick VIII. The second episode of the Schleswig-Holstein question followed, resulting in the loss of the duchies. Frederick VIII., brother of Queen Alexandra of Britain, succeeded his father, 1906, and was followed by his son, Christian X. 1912. The present constitution of Denmark is based on charter of 1915. Following the World War, plebiscites in N. and S. Schleswig, March 1919, resulted in the N. part reverting to Denmark while the S. remained German.

Although Denmark did not suffer as much as the other countries of Central Europe from economic conditions following the World War, there was, especially in 1922, a great deal of unemployment. There were also financial difficulties resulting from a crisis in the affairs of the Landemandsk Bank, the chief financial institution in the country. The Rigstag, in February, 1923, passed a bill establishing a State guarantee for the bank, until 1928. Owing to a reduced birth rate and an increased death rate the population of Denmark decreased 1.007 per cent, from July 1921 to July 1, 1922, or from 3,383,000 to 3,318,000.

Literature.—Danish is a Scandinavian tongue akin to that of Sweden. An early writer of note was Saxo Grammaticus 1140-1206, whose Lat. history, *Gesta Danorum*, although not critical, is invaluable as literature. Denmark has also a fine collection of vernacular ballads and romances, collected in the 16th cent., but composed at the height of the Middle Ages. As in other countries, vernacular prose, except for isolated documents, etc., and drama commence in the 16th cent.; poetry after the Renaissance manner is represented by the great Anders Kristensen Arrebo, 1587-1637. In the 17th cent. Thomas Kingo, 1634-1703, wrote religious verse of distinction. Ludvig Holberg, 1684-1754, author of witty, polished comedies in the Fr. manner, has been called the Plautus of Denmark.

Denmark felt the Romantic Movement very early. Johannes Ewald, 1743-81 and Herman Wessel, 1742-85, by tragedy and comedy respectively, slew the Classical School. The movement was organized by Schack von Staffeldt, 1769-1826 and Ohlenschläger, 1779-1850, who learned in Germany to turn back to the Middle Ages for inspiration. Blicher, 1782-1848, wrote poems and stories at the height of the new manner. The mediæval revival was the great influence on Ingemann, 1789-1862, the 'return to nature' the motif of Winther, 1796-1876. Among the greatest of the poets was Frederick Paludan-Müller, 1809-76. The chief prose writer of the movement was Hans Christian Andersen 1805-75, whose *Fairy Tales* were pub. in 1835. Like other countries, Denmark came to an end of her Romantic Movement; Schandorph, 1836-1901; Drachmann, 1846-1908; and Jacobsen, 1847-85. Side by side with these pure stylists ran the realistic movement under Georg Brandes, a critic of European renown; one of its chief exponents is Pontoppidan, *b.* 1857.

Government is a limited monarchy; the parliament, Rigsdag, consists of the 'House of Aristocrats', Landsthing, and Lower House, Folkething. Landsthing consists of 72 members; the 140 members of the Lower House, who are paid, are elected under a system of universal suffrage.

Denmark has a citizen army with few exemptions; the active army numbers about 14,000. A considerable sum is spent annually on the small fleet for coast defense.

Lutheranism became the state religion in 1536, but there is religious toleration. The archiepiscopal see is at Röskilde. Copenhagen Univ. dates from 1479; elementary education became compulsory in 1814; the country is strongly democratic.

The Faroes are considered an integral part of Denmark, whose only colonial possession is Greenland. St. Croix, St. Thomas, and St. John in the Dan. W. Indies were sold to U.S. in 1916.

Chief centers of population are the cap., Copenhagen Aarhuus, Odense, Aalborg, Horsens, and Randers. Area, including the restored part of Schleswig, 17,582 sq. m.; pop. 3,267,800.

DENNERY, ADOLPHE (1811-99), Fr. dramatist; wrote libretto of Gounod's *Faust*, 1856.

DENNEWITZ (51° 58′ N., 12° 56′ E.), village, Brandenburg, Prussia, Germany; scene of defeat of French by Prussians, 1813.

DENNIS, JOHN (1657-1734), Eng. critic; ed. Cambridge; unsuccessful as playwright, he turned to literary criticism, and became involved in quarrels with Pope, Addison, and Swift; immortalized in the *Dunciad*.

DENNISON, a city of Ohio, in Tuscarawas co. It is on the Pittsburgh, Cincinnati, Chicago and St. Louis, and on the Panhandle Ohio Canal. It has a hospital, public library, and its industries include railroad work shops, and sewer pipe works. Pop. 1920, 5,524.

DENNY, COLLINS (1854), bishop, *b.* at Winchester, Va., son of William R. and Margaret A. Collins Denny. He was educated at Princeton and at the University of Virginia. After practicing law at Baltimore for two years he entered the M.E. Ch., S. ministry in 1880 and afterwards visited the Asiatic missions of the M.E. Ch., S., was professor of mental and moral philosophy at Vanderbilt University and in 1910 was elected bishop of M.E. Ch., S. In addition to contributions to various religious periodicals he was the author of *A Manual of the Discipline of the M.E. Ch., S.*, 1920.

DENNY, GEORGE HUTCHESON (1870), an American university president, *b.* in Hanover County, Va. After graduating from Hampden-Sidney college, in 1891, he was five years instructor there, then professor of German and Latin, becoming acting president during 1901-2, after which he was president of the Washington and Lee University till 1911. Since 1912 he has been president of the University of Alabama. During 1917-18 he was head of the cottonseed industry division of the United States Food Administration in Washington, D.C. He is the author of *The Subjunctive Sequence After Adjective and Substantive Predicates and Phrases*, 1896.

DENON, DOMINIQUE VIVANT, BARON DE (1747-1825), Fr. archæologist and artist; director-general of Fr. museums.

DENOTATION, term used in logic for sum-total of objects having a given qualification.

DENSITY of a substance is the mass of unit volume. It may be expressed as the mass of a cubic centimetre in grammes or of a foot in lbs. It is generally obtained by determining the ratio of the density of the substance to that of some standard substance, in which case the densities are relative and are often called *specific gravities*. Gases are referred to hydrogen, the density of which at 0° C. and one atmosphere is taken as unity. The d. of liquids is referred to that of water at the required temperature. One cubic centimetre at 4° C. is assumed to weigh exactly one gramme, although careful experiment has ascertained it to be .99996 gr.

DENSU, CHO (1352-1431), Jap. artist, one of most famous of his country; his portrait of the priest, Shoichi Kokushi, is regarded as one of the world's greatest portraits.

DENTAL SURGERY, department of the science of healing, which in its present day development includes a theoretical and practical knowledge of the structure and physiology of the mouth, the gums and the teeth, their surgical and mechanical treatment, the healing of diseased tissues and the restoration of dental structures. As a genuine science, it is little more than a century old. In ancient times the care of the mouth and teeth was included in the general practice of medicine. References to it are found in early Babylonian and Egyptian literature. Pastes, powders and plasters of various substances were prescribed for the cure of toothache, and there were special prescriptions for loose teeth, caries and abscesses. Among the Hindus, great care was taken to keep the teeth clean and free from deleterious substances. The Romans had an abundance of toothache cures, so-called. Remedies consisted of hyssop, licorice, dog's milk and goat's butter together with various ridiculous ingredients. The mechanical side of dentistry was known to them as is shown by an extract from the Twelve Tables which reads: 'Neither add any gold (to a corpse); if any one shall have teeth bound with gold, it shall be no offense to bury or burn him with it.' Many specimens of dentistry have been found in Roman and Etruscan burial places.

In the Middle Ages the care of the teeth was in the hands of the 'leeches' who wandered as mountebanks from place to place palming off worthless remedies on the credulous populace. Dentistry had no standing as a really learned profession, prior to the appearance in 1728 of the work of Fauchard, 'Le Chirurgien Dentiste.' Even following that date its advance was slow and halting until about the middle of the nineteenth century. In 1839 it received a marked stimulus in America by the publication of The American Journal of Dental Science and the incorporation of the first dental college in the world, the Baltimore College of Dental Surgery. That date marked the practical divorce of dentistry from medicine. In this country it has made greater strides than in any other. Anaesthesia was first introduced in America, and the art of replacing lost portions of tooth crowns by gold fillings has had here its greatest development. The whole method of filling teeth with gold and restoring the artistic configuration of the tooth was revolutionized by the discovery by Dr. Arthur of Baltimore of the cohesive property of annealed gold foil. Most of the ingenious instruments now in use, such as the dental engine, the electro-magnetic mallet, the rubber coffer-dam are American inventions, and improvements in dental therapeutics are also mainly of American origin. Strict supervision is exercised by the States over the requirements of study and the issuing of licenses, and the profession is steadily advancing in usefulness and dignity. See TEETH.

DENTATUS (*d.* 270 B.C.), Rom. general and consul; conqueror of Pyrrhus and of Samnites.

DENTIL, in architecture, tooth-like projecting block employed in cornices.

DENTISTRY. See DENTAL SURGERY.

DENTON (53° 27′ N., 2° 7′ W.), town, Lancashire, England; felt hats. Pop. 17,000.

DENTON, a city of Texas, in Denton co., of which it is the county seat. It is on the Missouri, Kansas and Texas, and the Texas and Pacific railroads. It is the center of an important cotton, wheat, corn and live stock region, of which it is the trading point. Here is the North Texas State Normal College and the College of Industrial Art. Pop. 1920, 7,626.

DENVER, a city of Colorado, the capital of the State and the county seat of Denver co. It is on the Sante Fe, the Colorado and Southern, the Burlington, the Denver and Salt Lake, the Rock Island, and the Union Pacific railways, and at the meeting of South Platte River and Cherry Creek. Denver, from its geographical situation, is the chief distributing point for a territory which extends over 1,700 miles east and west and over 1,600 miles north and south, with a total population of over 20,000,000. The city is admirably situated, about one mile above sea level. The eastern base of the Rocky Mountains is within 15 miles. From the clarity of the atmosphere and the salubrious climate, Denver is a favorable residence place for persons suffering with pulmonary complaints. The total area of the city is over 60 square miles. While it is to a large extent a residential city, it is important industrially. The output of its industries are valued at over $100,000,000 per year. The fact that it is near the great mining region of the State gives it additional importance, and the manufacture of mining machinery is one of the most important branches of its industry. It is also the center of a large stock raising region and there are stock yards for the killing and preparation of beef, covering more than 150 acres of land. Denver is the chief distributing center for the retail trade for a territory that extends 600 miles in each direction. It is also the financial center of the Rocky Mountain region and has a branch of the Federal Reserve Bank. The city is attractively laid out and is notable for the number of parks of which there are 35, including the city park with an area of nearly 500 acres. The streets are specially well lighted with an ornamental lighting system. The notable public buildings include a post-office, State Capitol, municipal auditorium, the Colorado Museum of Natural History, and many handsome business buildings. A noteworthy feature is a civic center, 13 acres in extent, containing a Greek open air theatre. The school system is of special excellence and nearly 50,000 pupils are enrolled. There are 60 graded schools, 5 high schools, and many evening and special schools. The educational institutions of the city include the University of Denver, the Walcott School for Girls, the Loretta Heights Academy, Colorado Women's College, and the Sacred Heart College for Boys. There is a handsome public library erected at a cost of $300,000 and several branch libraries. Denver was founded in 1858 and was incorporated in the following year. It took its name from General J. W. Denver, who was then Governor of Kansas. In 1867 it became the capital of Colorado Territory. Its first connection by rail with the east and south was made in 1870 on the completion of the Denver, Pacific and Kansas Pacific railroads. Pop. 1920, 356,491.

DENVER, UNIVERSITY OF, an institution of higher learning, founded in

1864, in Denver, Colo. It has a library of about 50,000 volumes. In 1922-3 the student body was 2,046, and the faculty numbered 200. The Chancellor then was Wilber D. Engle.

DEODAR, or *Cedrus Deodara,* a species of Conifer, which occurs in the Himalayas. The plant is a beautiful evergreen tree, the leaves persisting for over a year, and the cone takes two or three years in ripening.

DEODORIZER (Lat. *de*, away from; *odor*, smell), a substance used for destroying harmful smells, chiefly those which arise from decomposing matter. Charcoal and quicklime are very powerful D's. Disinfectants may be D's. if they destroy smells, as, for instance, zinc chloride, so also may antiseptics, though, if they are only germ destroyers where no smell arises, they cannot, strictly speaking, be placed under this heading.

DÉOLS (46° 50′ N., 1° 40′ E.), town, Indre, France; X.-cent. abbey.

DE PAUW UNIVERSITY, a co-educational institution founded at Greencastle, Ind., in 1837, under the auspices of the Methodist Episcopal Church. During 1920 the income of the institution amounted to $294,748. In the following year a drive was made for an additional fund of $2,000,000. In 1922-23 the student body numbered 1,217 and the faculty 47. There are a total of over 35,000 volumes in the libraries. George Richmond Grose was president in 1923.

DE PERE, a city of Wisconsin, in Brown co. It is on the Chicago and Northwestern, and the Chicago, Milwaukee and St. Paul railroads, and on the Fox River. It is a port of call for lake steamers. It has important industries, including the manufacture of bricks, pottery, stationery, gasoline engines, yachts, woolen goods, etc. In the vicinity are important quarries of limestone. The city has a large trade in cattle, grain and hay. Here is St. Norbert's College. The river is spanned by a bridge, 1,600 feet long. Pop. 1920, 5,165.

DEPEW, CHAUNCEY MITCHELL (1834), a U.S. senator and an orator, *b.* in Peekskill, N.Y. He graduated from Yale University, in 1856, studied law and began to practice in New York. In 1861 he was elected to the New York State Assembly, becoming Secretary of State of New York in the following year. In 1872 he ran for Lieutenant-Governor of New York on a Liberal-Republican ticket, but was defeated. He was president and on the board of directors of a number of railroads, including the New York Central R.R., of whose board he was chairman. In the National Republican Convention of 1888 he received 99 votes for the Presidential nomination. From 1899 till 1911 he was a member of the U.S. Senate. He was widely known as an orator, and especially as an after-dinner speaker.

DEPILATORY, anything that will remove hair, by chemical or other means; electrolysis is the only satisfactory method.

DEPOSIT. See GEOLOGY.

DEPRETIS, AGOSTINO (1813-87), Ital. politician; follower of Mazzini; in cabinet, 1862; premier, 1881-87; carried through some reforms, but extravagant financier.

DE PROFUNDIS (Lat. 'Out of the depths'), the title and first words of Psalm cxxx., one of the seven penitential psalms. According to the Roman rite it forms part of the office for the burial of the dead. Oscar Wilde's last book, written in Reading jail, bore this title.

DEPTFORD (51° 29′ N., 0° 2′ E.), S.E. metropolitan borough, London, on bank of Thames; site of dockyards closed 1869, now occupied by cattle markets. Pop. 1921, 112,500.

DE QUINCEY, THOMAS (1785-1859), Eng. essayist; *b.* Manchester, and ed. at Grammar School there and at Oxford. His early life was marked by many irregularities, and while at Oxford he became a victim to the opium habit, which had disastrous effects upon his future career. About 1807 he made the acquaintance of Wordsworth, Coleridge, Lamb, and others, settled at Grasmere; removed to Edinburgh in 1828, where, and at Lasswade, he spent the remainder of his life. His *Confessions of an English Opium-Eater* appeared in the *London Magazine* in 1821, and was followed by critical writings and biographical studies in *Blackwood, Tait's Magazine,* and other journals.

DERA GHAZI KHAN (30° 5′ N., 70° 52′ E.), town, on Indus, Derajat division, Punjab, India. Pop. 24,000.

DERA ISMAIL KHAN (31° 49′ N., 70° 52′ E.), town, near W. bank of Indus, N.W. Frontier Province, India. Pop. 32,000.

DERBENT, DERBEND (42° 2′ N. 48° 15′ E.), town Daghestan Russia, on W. coast of Caspian; silk and cotton fabrics; fruit and madder. Pop. 15,000.

DERBY (52° 55′ N., 1° 28′ W.), town, capital of Derbyshire, England, on

Derwent; royal borough in XI. cent.; has Free School dating back to Henry II.; interesting churches, town hall, free library, art gallery, museum; manufactures silk, lace, iron, porcelain; near supposed site of Rom. station *Derventiae*. Pop. 1921, 131,800.

DERBY, a city of Connecticut. It is on the New York, New Haven and Hartford Railroad, and at the junction of the Naugatuck and Housatonic rivers, 9 miles W. of New Haven. The towns of Birmingham and Derby were consolidated in 1893, forming the present city of Derby. The excellent water power from the two rivers furnishes power for important industries which include the manufacture of brass and iron goods, paper, pins, typewriters, pianos, organs and hosiery. The city was at one time an important shipbuilding center. It is connected with Ansonia by a bridge across the Naugatuck River. The city has several parks and important public buildings. Pop. 1920, 11,238.

DERBY, EARLDOM OF. Edward Geoffrey Smith Stanley, 14th Earl, 1799-1869, strong advocate of great Reform Bill; chief secretary for Ireland, 1830; from 1834 Conservative; succeeded to earldom, 1851; secretary of state for colonies, 1833-4; prime minister, 1852, 1858, and 1866; vigorous opponent of disestablishment of Irish Church; good classical scholar; pub. translation of *Iliad*; fine orator. His son, Edward Henry, 15th Earl, 1826-93, secretary for colonies, 1858, 1882-5; secretary of state for India, 1858-9; foreign affairs, 1866-8, 1874-8. Frederick Arthur, 16th Earl, 1841-1908, brother, secretary of state for colonies, 1885-6; president of Board of Trade, 1886-8; gov.-gen. of Canada, 1888-93; chancellor of Univ. of Oxford. Edward George Villiers Stanley, 17th Earl, 1865, present earl, succeeded his father; fought in S. Africa; postmaster-general, 1903-5; director-general of recruiting, 1915, 'Derby scheme'; under-secretary and afterwards secretary for war, 1916-18; Brit. ambassador to Paris, April 1918. Secretary for war in A. Bonar Law Cabinet, 1922.

DERBYSHIRE (53° 9′ N., 1° 35′ W.), county, England; bounded to N. by Yorkshire, E. by Nottinghamshire, S. by Leicestershire and Staffordshire, W. by Staffordshire and Cheshire; area, 1,008 sq. miles. D. abounds in picturesque scenery; valleys of Derwent and Wye being especially beautiful. Other rivers are Trent, Dove, and Dane. Chief towns are Derby, capital; Chesterfield; Glossop; Ilkeston; Ashbourne. Matlock, Buxton, and Bakewell are popular health-resorts on account of their mineral springs. D. supplies limestone, lead, zinc, and chiefly in E. has important collieries. Manufactures include silk, cotton, elastic web, porcelain, and lace. D. has some fine old churches; ruined Abbeys of Dale and Beauchief; remains of Bolsover, Duffield, and Codner Castles; famous mansion of Haddon Hall, and Arbelow, interesting stone-circle. Pop. 1921, 714,539.

DE RESZKE, EDOUARD (1856-1917), a Polish opera singer, bro. of Jean De R., *b.* in Warsaw. In his youth he studied agriculture, but later, influenced by the example of his elder brother, decided to cultivate his fine bass voice. His first appearance was in Paris, in 1876, where his success was so decided that he was engaged to tour Europe and America. He appeared on many occasions at the Metropolitan Opera House, in New York City. He created the roles of the King in Catalini's *Edda* and Charles V. in *Marchetti*. In this country he was especially identified with the part of Mephistopheles in *Faust*.

DE RESZKE, JEAN (1853), a Polish opera singer, *b.* in Warsaw. At first he studied law, but having already developed his voice partially in the cathedral choir, he continued studying singing in Italy. He first appeared in Venice, in 1874, as Alfonso in *La Favorita*. Then followed engagements in London and Paris. In 1876 he began re-training his voice which was naturally tenor, though hitherto he had been singing baritone. From 1893 until 1899 he appeared continuously at the Metropolitan Opera House, in New York City, where he added Siegfried to his repertoire, but also appeared in *Aida*, *Faust* and *Le Cid*. In 1902 he settled in Paris as a teacher of singing.

DERG, LOUGH (54° 40′ N., 7° 56′ W.), lough, County Donegal, Ireland; legendary scene of St. Patrick's purgatory.

D'ERLON, JEAN BAPTISTE DROUET, COUNT (1765-1844), marshal of France; fought in Revolutionary campaigns, at *Jena*, *Waterloo*, and in Algeria, 1834.

DERMATOLOGY. See Skin.

DERMOT MAC MURROUGH (*d.* 1171), king of Leinster; brought the English over into Ireland.

DERNBURG, BERNHARD (1865), Ger. Jewish statesman; prominent in banking and financial circles; colonial secretary, 1907-10, when anti-Jewish influences compelled him to retire. As missionary of kultur' to U.S., vigorously spread Ger. propaganda; attempted to condone sinking of *Lusitania*, and became so unpopular that his deportation was requested.

DÉROULÈDE, PAUL (1846-1914), Fr. poet, dramatist, and politician; served with distinction during Franco-Ger. War, 1871; his patriotism found expression in such works as his *Chants du Soldat*, his hymn, *Vive la France*, and the dramas *Pro Patria* and *Messire Du Guesclin*. Other works include *L' Hetman*, *La Mohabite*, and *La plus jolie Fille du Monde*.

DERRICK, tackle, or crane, used for hoisting purposes; derived from name of hangman.

DERRICK, SYDNEY JACOB (1866), an American college president, *b.* at Little Mountain, S.C., son of Jacob and Martha Catherine Kesler Derrick. He was educated at Newberry College, (S.C.) and at Cornell and Columbia Universities. He taught at White Rock School from 1892 until 1894 when he became superintendent of schools at Lexington, S.C. In 1896 he became principal of the preparatory department of Newberry College where he was later professor of history and economics and of which institution he was made president in 1918. He was also a member of the State Board of Education, S.C. 1916-20, and chairman of the Local Exemption Board.

DE RUYTER, MICHAEL ADRIANZOON (1607-76), Dutch admiral; served with Van Tromp in first Dutch War with England, 1653; assisted Danes against Swedes, 1659; in Second Dutch War defeated Eng. fleet at N. Foreland, 1665; sailed up the Thames and burned shipping, 1667; in Third Dutch War he defeated combined Fr. and Eng. fleets at *Sole Bay*, 1672; assisting Spain against France was wounded near Messina, and a week later *d.* at Syracuse.

DERVISH, Persian for 'beggar,' applied to members of Muhammadan religious orders, and especially to members of mendicant orders.

DERWENT.—(1) (54° 12′ N., 0° 35′ W.), river, England; rises in Yorkshire Wolds, enters Ouse near Barnby. (2) (53° 10′ N., 1° 37′ W.), river, Derbyshire, England; joins Trent 7 miles S.E. of Derby. (3) flows N. through Lakes Derwentwater and Bassenthwaite; enters Irish Sea at Workington. (4) (54° 54° N., 1° 50′ W.), river, Northumberland and Durham, England; joins Tyne near Newcastle. (5) river, Tasmania; flows from Lake St. Clair to Storm Bay navigable to New Norfolk.

DERWENTWATER (54° 35′ N., 3° 9′ W.), beautiful lake, Cumberland, England, S. of Keswick; an expansion of river Derwent; studded with islands.

DESAULT, PIERRE JOSEPH (1744-95), Fr. surgeon; his clinical teaching at the Hôtel Dieu, Paris, attracted an enormous number of pupils; pub. works on surgery.

DESBOROUGH, JOHN (1608-80), Eng. soldier; fought in Civil War on Parliamentary side; imprisoned, but set free under Charles II.

DESCARTES, RENÉ, RENATUS CARTESIUS (1596-1650), Fr. philosopher and mathematician; founder of modern rationalistic philosophy; *b.* of noble Touraine family; ed. at the Jesuits' school of La Fleche, where he was thoroughly trained in math's and scholastic philosophy. When twenty-three, in winter quarters at Neuberg, he first thought of the principle of method which guided all his philosophy, and discovered, also, the possibility of employing algebra to solve geometrical problems. His chief works were the *Discourse on Method*, 1637; *Meditations*, 1641; *Principia*, 1644. His writings involved him in much theological disputation, and to avoid religious persecution he accepted invitation to become tutor to Queen Christina, and withdrew to Stockholm, where he *d.* a few months later.

D. anticipated several later discoveries in science, accepted a modified Copernican theory, worked on the properties of curves, and was a pioneer of the calculus; above all else, he was a mathematician, seeking to apply the geometrical method to metaphysics.

DESCENT. See Evolution.

DESCHANEL, PAUL EUGENE LOUIS (1856-1922), Fr. statesman; entered the chamber in 1885 as republican; was soon known as brilliant speaker; vice-president, 1896; was president, 1898-1902, 1912-20; member of Academy, 1899; twice president of commission on foreign and colonial affairs; chosen to succeed Poincaré as president of the Fr. republic, Jan. 1920. Resigned on account of ill-health, Sept. 1920. He died April 28, 1922. Wrote on Fr. colonial questions, orators, and statesmen, *Gambetta*, Eng. trans. 1920, etc.; several of his works have been 'crowned' by the Academy.

DESERT, arid or barren tract either wholly or almost devoid of vegetation. Sahara is the most familiar instance in tropical regions.

DESERT, GREAT AMERICAN. See GREAT AMERICAN DESERT.

DESERTION, act of abandonment, such as the d. of wife or children; or d. from the army or navy. The latter offense was formerly punishable by death; now by imprisonment.

DESFONTAINES, RENÉ LOUICHE (1750-1833), Fr. botanist, prof. of Bot. in Jardin des Plantes, 1786; investigated the flora of N. Africa.

DESHAYES, GÉRARD PAUL (1795-1875), Fr. geologist; prof. of Natural History in Natural History Museum, Paris; pub. works on geol., particularly on fossil molluscs.

DESICCATED FOODS. See FOODS, DESICCATED.

DESICCATION, the abstraction of water from a substance by gentle heat or by strong sulphuric acid in an air-tight chamber. See FOODS, DESICCATED.

DESIDERIUS (*fl.* 756-774), king of Lombardy; conquered by Charlemagne.

DESIGN. See ART.

DESIGN, ACADEMY OF. See ACADEMY OF DESIGN.

DES MOINES, a city of Iowa, capital of the State, and the county seat of Polk co. It is on the Rock Island, the Northwestern, the Burlington, the Chicago, Milwaukee and St. Paul, and other railroads, and at the junction of the Des Moines and Racoon Rivers. The city is built on a plateau which rises from 15 to 20 feet above tidewater, and is intersected by both rivers, which within the city limits are spanned by eight bridges. The business portion lies near the rivers and the residential part is on the higher ground beyond. The city is well laid out and has an extensive park system. The notable buildings include the Capitol, United States Building, State Library, State Historical Building, an auditorium, several hospitals, court-house, grand opera house, city hall, etc. Des Moines is an important industrial city and is in the center of a rich coal mining district. The chief manufactures include packing of pork and the making of starch, glass, fire brick, tile, engines, boilers, cement, furniture, and brass goods. There is an excellent school system which includes 5 public high schools. The institutions of higher education are Des Moines College, Drake University, Highland Park College, and Grand View College. Des Moines was first settled in 1846 and was a town in 1853. It became a city and the capital of the State in 1857. Pop. 1920, 126,468.

DES MOINES COLLEGE, organized by the Baptists in 1865 as the University of Des Moines (Ia.), in 1865, but later changed to its present scope to conform to the aims of the Baptists of Iowa. Its funds amount to over $100,000; it has a nine-acre campus and buildings valued at $150,000. It has four departments; college, academy, music and art. In 1922 there were 931 students enrolled and it had a faculty of 43.

DES MOINES RIVER, the largest stream in Iowa, rises in southwestern Minnesota in two forks, flows south-southeast and empties into the Mississippi River about four miles from Keokuk, Ia. Its total length is about 500 miles and it drains a rich agricultural country. Its fall is so rapid that it furnishes water power for a great number of industrial establishments.

DESMOND, GERALD FITZ-GERALD, 15TH EARL OF (*d.* 1583), succ. his *f.*, 1558; imprisoned in Tower for demeanor before Privy Council, 1562.

DESMOULINS, LUCIE SIMPLICE CAMILLE BENOÎT (1760-94), Fr. journalist. On outbreak of Revolution D. supported it, stirring populace by fiery speeches and pamphlets; wrote articles urging abolition of monarchy; pub. weekly *Les Revolutions de France et de Brabant*, 1789-91; became a member of Cordeliers Club and a follower of Danton; elected to National Convention, 1793; first friend of Robespierre, but later incurred his enmity; guillotined on same day with Danton and others, April 5.

DE SOTO, a town of Missouri, in Jefferson co., on the St. Louis, Iron Mountain & Southern R.R., 40 miles south-by-west of St. Louis and about fifteen miles from the Mississippi River. It is chiefly the center of and point of export for the zinc and lead mines in the vicinity, but also exports large quantities of grain and livestock. Extensive railroad repair shops are located here. The population in 1920 was 5,003.

DE SOTO, FERNANDO (1496-1542), Span. explorer; took part in Pizarro's conquest of Peru; discovered the Mississippi.

DESPENSER, HUGH LE, Eng. chief justiciar; killed at *Evesham*, 1265.

DESPENSER, HUGH LE (1262-1326), Eng. courtier; summoned to Parliament, 1295; he became favorite of Edward II. after Gaveston's death; Earl of Winchester, 1322; incurred enmity of baronage; hanged.

DESPOTISM (Gr. *despotes*, like *tyrannos*) implies absolute but not necessarily bad rule; modern use of word assumes a democratic or republican standpoint, and writers distinguish between ordinary despotism, by inference bad, and rule of 'benevolent despot.' A despotism, however benevolent, destroys initiative in the body of the people, and the continuance of such rulers cannot be guaranteed. In modern times despotisms supposed to be most firmly founded have been brought down—(*e.g.*) Turkey, 1908; China, 1912; and Russia, 1917. Under a parliamentary régime the danger of despotism resides not in autocratic power of princes, but in the enormous growth of bureaucracy, and in the tyranny of party machinery.

DESSALINES, JEAN JACQUES (1760-1806), Emperor of Haiti. Seized the government after deportation of Toussaint L'Ouverture; appointed governor-general for life. In 1804 declared Emperor; ruled cruelly and was slain by one of his soldiers on October 17, 1806.

DESSAU (51° 50′ N., 12° 13′ E.), town, on Mulde, capital of Anhalt, Germany; several art collections; sugar, machinery, carpets. Pop. 57,658.

DE STENDHAL. See BEYLE, HENRI.

DESTINN, or **DESTINOVA, EMMY** (1878), a Bohemian opera singer, *b.* in Prague. Her real name is Kittl. She was given a trial at the Berlin Royal Opera, in 1897, where her soprano voice created such a success that a permanent engagement followed, her most successful role being Senta in *The Flying Dutchman*. In 1901 she appeared in Beyreuth at the invitation of Wagner's widow. She made a big success in London, in 1905, in *Madame Butterfly*.

D'ESTOURNELLES DE CONSTANT, BARON (Paul Henri Benjamin) (1852), a French politician and journalist; *b.* in La Fleche, France. For eight years he was attached to the French Embassy in England, after which he was elected a member of the Chamber of Deputies. He was a member of the two Hague peace conferences and of the Hague Court. His prominence, however, rests on his wide activity as a journalist and writer. Among the books he has written are *Pygmalion*; *Provincial Life in Greece*; and *The United States of America*, the latter being a report of his observations during a visit to this country.

DESTROYERS, or **TORPEDO-BOAT DESTROYERS,** small fast craft, designed in the first instance to act against hostile torpedo boats.

DETAILLE, JEAN BAPTISTE (1848-1913), Fr. artist; excelled in military and historical pictures—(*e.g.*) *The Dream* (Luxembourg), *The Passing Regiment*, *The Conquerors*, etc.; equestrian portrait of King Edward VII.

DETECTORS, WIRELESS, a device used in radio receiving sets to convert the high frequency currents flowing in the antenna or its related circuits to a uni-directional, pulsating current or to an alternating current of a frequency of the human ear. Some minerals such as Silicon, Carborundum, Zincite and Bornite act to some extent as a rectifier (or electrical check valve), that is, they permit a current to pass through them in one direction much more easily than in the opposite one. Such minerals, if properly placed in the circuit of a radio receiver, act as detectors, and are commonly called crystals. Detectors working on electrolytic and magnetic principles have been used successfully. The most sensitive and dependable detectors are those of the vacuum tube type. The action of these is based on the emission of electrons from highly heated metals in vacua. These electrons have the tendency of conveying current, from conductors placed in their path, in one direction and not in the other, hence their rectifying and 'detecting' action. This type of detector, called Fleming Valves, audions, three element valves and triodes possesses the desirable property of remaining in adjustment for a long time, which cannot be said of some crystals. See RADIO TELEPHONY.

DETMOLD, cap. of former principality of Lippe, Germany (51° 56′ N., 8° 53′ E.), at N. foot of Teutoburger Forest; linen weaving, tanning, brewing, and marble quarrying; 3 m. S.W. is gigantic statue of Hermann (Arminius), chief of the Cherusci, who annihilated the forces of the Roman Varus, A.D. 9. Pop. 15,000.

DETROIT, the chief city of Michigan, in Wayne co., of which it is the county seat. It is on the Canadian Pacific, the Grand Trunk, the Lake Shore and Michigan Southern, the Pere Marquette, the Wabash, the Michigan Central and other railroads, and on the Detroit River and Lake St. Clair. The city extends along the river for over 12 miles, and has a total area of about 94 sq. miles. It occupies a beautiful site on a ground which rises from the river. Detroit has become in recent years one of the most important industrial cities in the United States. This is due largely to the development there of the manufacture of automobiles. Many of the largest companies have extensive plants here. Its industries, however, are widely diversified. There are over 3,000 different classes of commodities, the most important of which include adding machines, soda and alkali products, stoves, steamships, aeroplanes, gas engines, oils, drugs, and paints. It is also a jobbing and wholesale center of great importance. Detroit River bears an immense freight traffic. In normal years over 40,000 vessels reach the city. Detroit is laid out with special care. There are over 700 miles of streets, the greater part of which are paved with brick or asphalt. There is an attractive park system which includes an island park known as Belle Isle, containing over 700 acres. This is in the center of the Detroit River, about 3 miles from the heart of the city. The public buildings, of which there are many, include Wayne County court-house, city hall, post-office, Detroit Athletic Club, Y.M.C.A. building, and several hospitals. The Museum of Art contains a library and a valuable collection of modern and classic art. The educational system is notable for its excellence. It includes over 160 public and 75 private schools. In connection with the school system are operated three college units, including a medical school, a normal school and a junior college. These eventually will make up the University of the City of Detroit. The city is noted for the large number of handsome business buildings, theaters, and hotels. Detroit was founded in 1701 by the Fr. explorer, Cadillac, and was first called Pontchartrain. The name Detroit is the Fr. d'etroit, meaning the strait, and was given to the city because of its situation on the narrow strait connecting Lake St. Clair and Lake Erie, now known as Detroit River. The French were superseded by the English and the site was held by them till 1796, when it was captured by General Anthony Wayne. The English again had control in 1813, but Perry's victory on Lake Erie gave the entire territory to the United States.

In the last decade the city has shown a remarkable increase in population. It grew from 465,766 in 1910 to 993,678 in 1920.

DETROIT RIVER or **STRAIT OF ST. CLAIR,** connecting Lake St. Clair and Lake Erie, flowing south and forming part of the boundary between Canada and the United States. It is about 25 miles in length, from a half to three miles in width, has a slow current and opposite the city of Detroit, Mich., forms a capacious harbor suitable for vessels of the largest tonnage. Probably no river in the world carries so much traffic.

DETTINGEN (50° 2′ N., 9° 1′ E.), village, on Main, Bavaria, Germany; scene of defeat of French in 1743 by Anglo-German army.

DEUCALION (classical myth.), Thessalian prince, who, when Zeus sent a deluge to destroy the earth, escaped with his wife, Pyrrha, in ark; after the flood the pair were ordered to cast stones behind them, which turned into men and women.

DEUCE (Fr. *deux*, two), two in cards; a term used in tennis; as exclamation, meaning 'the devil!' probably derived from a losing throw at dice.

DEUS, JOÃO DE (1830-96), Portug. poet; one of the greatest since Camoens.

DEUTERONOMY, BOOK OF, last of the Pentateuch, or Mosaic books—though not now, any more than the others, viewed as the actual work of Moses—consists largely of laws, specially chapters 12-26, 5-11 being introductory and 27, 28 supplementary. The laws in *Exodus* 20-23 are the foundation of D., which is parallel to *Leviticus* 17-26. The spirit of D. is not merely legal, but profoundly moral and spiritual. Date before 621. D. has peculiar words and phrases and has influenced other Old Testament books.

DEUTSCHLAND, Ger. commercial submarine, built 1916 to communicate with U.S. in defiance of Brit. blockade. Gross tonnage, 790; carrying capacity, about 440 tons. Left Bremen, June 14, and reached Baltimore on July 9, with mails and dyestuffs; legal question as to her detention settled in her favor; returned with nickel and rubber, and reached Bremen, Aug. 25. Her commander, Captain König, became a popular hero and wrote a description of the voyage.

DEUX-SÈVRES (46° 30′ N., 0° 20′ W.), department, W. France; formed of parts of old province of Poitou; named from two rivers by which it is traversed, Sèvre-Niortaise and Sèvre-Nantaise; textiles; agricultural and mineral products, coal, marble, granite; capital, Niort. Area, 2,337 sq. miles. Pop. 337,627.

DEVA, beneficent spirits of the Buddhist and Hindu mythology.

DEVADATTA, *s.* of Suklodana, uncle of the Buddha; joined the brotherhood; later started order of his own, extant till IV. cent. A.D.

DE VALERA, EAMON (1882), Irish political leader. *b.* in New York City in 1882 of a Spanish father and Irish mother. Educated at the Christian Brothers School and Blakerock College.

Degrees B.A. and B.Sc. Royal University of Ireland. President of the Sinn Fein from 1917. In 1918 he was imprisoned by the British and escaped in February 1919. He declared that if the Paris Peace Conference refused Ireland political freedom that Ireland would fight. He visited the United States in June, 1919, and was generally received with enthusiasm as the 'President of Ireland.' In 1921 he defended the killing of British soldiers by Irish civilians.

On June 24, 1921 he was again imprisoned, but soon released. On July 9, the British Premier invited him and Sir James Craig, for Ulster, to a conference in London. They met July 14-21 and De Valera submitted the British proposals to Irish Parliament. August 10 the proposals were mostly rejected by representatives of revolutionary government. On October 11 De Valera and Sinn Fein delegates again conferred with Lloyd George. Objections were offered to the treaty offered, and the delegates demanded a popular vote in Ireland on the question. On January 6th, 1922 De Valera asked the Dail Eeireann, or Irish Parliament to wait for a popular vote before signing the British peace treaty and constituting Ireland a Free State. The 'Dail' ratified the peace treaty on January 7, and De Valera resigned. He was not present when the Free State was set up January 14, 1922. Arthur Griffith founder of Sinn Fein was elected President, Jan. 15. De Valera as president of the Sinn Fein put through the Executive Council a call for a meeting of the Supreme Assembly held February 7th, when it was found that there could be no agreement on the treaty. Before the date for a general election was fixed up, De Valera spoke and wrote against the treaty, and demanded a new register of voters, as half the Republican army were under 29, and deprived of the franchise. The Election was fixed for May 22, and it was declared that there was not time to revise the register of voters. De Valera on March 17 replied with a declaration of war, and fighting began in various parts of the country from May 3. The result of the election defeated Republican hopes, and civil war was let loose. In letters by De Valera captured in 1922 he acknowledged he had lost control of the Republican army. Murders, and burnings by Republicans continued through the year, but it was evident at the beginning of 1923 that the Free State Government must soon conquer. Meanwhile De Valera from safe retreats issued proclamations against the Free State Government and declaring the determination of the Republicans to fight until they had accomplished their aims. In May, 1923, he finally abandoned his resistance to the Free State, and directed his followers to submit. He was captured in Aug. 1923.

DEVAPRAYAG, DEOPRAYAG (30° 9′ N., 78° 39′ E.), village, Garwhal, United Provinces, India; Hindu place of pilgrimage.

DEVENTER (52° 15′ N.; 6° 9′ E.), town, on Yssel, Netherlands; flourished in Middle Ages; many antique buildings; ironworks, carpet factories. Pop. 28,005.

DE VERE, AUBREY THOMAS (1814-1902), Irish poet; author of *Legends of St. Patrick*, etc.

DEVICE, contrivance, or plan; heraldic figure on shield.

DEVIL, SATAN—The latter name means in Hebrew 'enemy,' and consequently in Christian theol. the archenemy of God and man, represented in the Bible as having the form of a serpent, the most subtle of beasts. In Milton he appears as an outcast of heaven, the lord of hell and the apostate angels. In mediæval times he came to be represented as a goat-like figure, since the goat is the type of uncleanness. That he was supposed to be black in color is shown in many references in lit. Other names for the d. are Apollyon, Lucifer, Beelzebub. The mediæval conception of the d. is more particularly identified with Mephistopheles of the Faust legend, the incarnation of the spirit of universal scepticism and mockery.

DEVIL-FISH. See FISHES.

DEVIL WORSHIP. See DEMONOLOGY.

DEVINE, EDWARD THOMAS (1867), an American social worker, *b.* in Union, Ia. Graduating from Cornell University, in 1887, he taught school for some years in Iowa. In 1896 he became secretary-general of the Charity Organization Society, in New York City, being also editor of *Charities*, which in 1909 was renamed *The Survey*. In 1905 he became professor of social economy at Columbia University. He has written *Economics*, 1898; *The Practice of Charity*, 1901; *Misery and its Causes*, 1909; *The Normal Life*, 1915, and *Social Work*, 1921.

DE VINNE, THEODORE LOW (1828-1914), an American printer, *b.* in Stamford, Conn. At an early age he left school and began learning the printers trade in a newspaper and job shop in Fishkill, N.Y. In 1849 he went to New York City where he was first employed by Francis Hart and later became a partner in his printing business. This firm eventually, in 1883, became known as 'The De Vinne Press,' and gradually established a reputation for fine art printing which spread even to Europe. Mr. De Vinne wrote voluminously on the art and craft of printing, among his works being *The Invention of Printing*, 1876; *Modern Methods of Book Composition*, 1904; and *Notable Printers of Italy During the Fifteenth Century*, 1910.

DEVIZES (51° 22′ N., 1° 59′ W.), market town, on Kennet and Avon Canal, Wiltshire, England; ruins of XII.-cent. castle.

DEVOLUTION, WAR OF (1667-68), Louis XIV. claimed, 1667, that succession to Spanish Netherlands 'devolved' upon his wife, Maria Theresa, on death of her *f.*, Philip IV. of Spain; war speedily made good the claim, and Flanders was ceded to France by Treaty of of Aix-la-Chapelle, 1668.

DEVON, EARLDOM OF, title held by Courtenay family.

DEVONIAN SYSTEM, in 1829 Sir R. Murchison and A. Sedgwick applied the name 'Devonian System' to rocks of Cornwall, Devon, and Somerset, previously known as *Old Red Sandstone*. These rocks fall between the Silurian and Carboniferous periods, and consist of different colored sandstones, grits, limestones, and calcareous slates; three groups, the Lower, Middle, and Upper, all containing fossil remains, including corals, crinoids, crustaceans, cephalopods, and mollusca. Middle group has richest deposit, the fossils being more abundant than in the arenaceous rocks of Scotland, Wales, and Herts, with which they are supposed to be contemporaneous.

D. rocks are found in other parts of the globe besides Devon and Cornwall, (*e.g.*), U.S., E. Canada, Novia Scotia, and Central Europe. They extend from the Adrennes into S. Belgium. Another group is cut through by the Rhine at Bingen, and yet another by the Moselle at Trèves.

DEVONPORT (50° 23′ N., 4° 11′ W.), fortified seaport on E. shore of Tamar estuary, Devonshire, England; important naval and military station; owes importance to royal dockyard, founded by William III., 1689, formerly known as *Plymouth Rock*. Pop. 81,694.

DEVONPORT (41° 9′ S., 146° 22′ E.), town, port, near mouth of Mersey, Tasmania.

DEVONSHIRE (50° 50′ N., 3° 50′ W.), county, S.W. England; bounded N. by Bristol Channel, W. by Cornwall, S. by Eng. Channel, E. by Dorset and Somerset; area, 2,598 sq. miles. D. is one of chief cattle and sheep-raising counties, and hardy ponies graze in Dartmoor and Exmoor. Chief rivers, Exe, Dart, Tamar, Teign, Taw, Torridge, and Plym rise mostly in Dartmoor and abound in trout. Torquay, Sidmouth and Teignmouth are health-resorts, on account of mild climate in S. Other towns are Exeter, capital; Plymouth, fine harbor; Devonport, Tiverton; Barnstable, Dartmouth, and Tavistock, D. produces copper, tin, manganese, granite, slate, marble, and potters' clay. It has important prehistoric monuments in Dartmoor; several interesting castles, abbeys, and churches; finest specimens of architecture at Exeter Cathedral. D. was birthplace of Raleigh, Drake, Hawkins, Grenville, Reynolds, Coleridge, Kingsley, and other famous men. Pop. 1921, 709,488.

DEW, small drops of water deposited during the night on substances which possess good radiating powers and which consequently cool quickly below the temperature of the surrounding air. As a result, the air which is in direct contact with such a substance becomes cooled until the *dew point* is reached, that temperature at which the water vapor already in the atmosphere is the maximum quantity the air can hold.

DEWAR, SIR JAMES (1842-1923), British chemist and physicist; with Abel had a part in invention of cordite; name chiefly associated with liquefaction of gases and researches on electrical and other properties of matter at lowest temperatures; in 1898 he liquefied hydrogen; since then all known gases have either been liquefied or frozen; president Brit. Association, 1902; knighted, 1914.

DEWAS (22° 58′ N., 76° 6′ E.), native state, Malwa, Central India; consists of two united states with two chiefs; capital, Dewas. Area, 886 sq. miles. Pop. 117,216.

DE WET, CHRISTIAN (1854-1922), Orange Free State general and politician; famed for guerrilla tactics during S. African War, 1899-1902; early in Great War, Oct. 1914, led a revolt, but was met and routed by Botha; escaped, but was ultimately captured and condemned to six years' imprisonment and fine of $10,000.

DE WETTE, WILHELM MARTIN LEBERECHT (1780-1849), Ger. theologian; prof. at Weimar, Berlin, and Basel; pioneer of critical study of Bible, specially Old Testament.

DEWEY, CHARLES MELVILLE (1849), an American painter, *b.* at Low-ville, N.Y., *s.* of Silas Bush and Jane Stoddard Dewey. He was educated at the district school and was later a pupil of Carolus Duran, at Paris. He specialized in landscapes and in addition to many of his pictures being in well known private collections he is represented in the Corcoran and National galleries at Washington, D.C.; the Art Institute, Brooklyn; Albright Gallery and the Metropolitan Museum of Art.

DEWEY, DAVIS RICH (1858), an American economist, *b.* at Burlington, Vt., son of Archibald S. and Lucina A. Rich Dewey. He was educated at the University of Vermont and at Johns Hopkins University. He was principal of Hyde Park High School, Chicago, from 1881-3. In 1886 he became asst. professor of economics and statistics at Massachusetts Inst. of Tech. and was made professor of same there in 1893. He was also on several boards and commissions to investigate various labor questions and other subjects of public interest and in 1919 was director of the economic section of information and education under the Department of Labor, Washington. Author: *Syllabus on Political History Since 1815*, 1887; *Financial History of the United States*, 1902; *Employees and Wages—Special Report 12th Census*, 1903, and *National Problems*, 1907.

DEWEY, GEORGE (1837-1917), American naval officer, *b.* at Montpelier, Vermont. After studying at the Northfield Military Academy he was appointed to Annapolis, from which he graduated in 1858. Commissioned lieutenant under Admiral Farragut he was assigned to the sloop-of-war Mississippi. Dewey was at Donaldsonville in 1863 and at Fort Fisher in 1864-65. In the last year he was appointed lieutenant-commander, and for two years was in active service on the Kearsarge and Colorado. He was attached to the Naval Academy for two years. In 1872 he commanded the *Narragansett* and in 1882 the *Juniata* of the Asiatic Squadron; in 1884 the *Dolphin*, and 1885-88 the Pensacola Flag Ship of the European Squadron. He then became chief of the Bureau of Equipment, Navy Department. In 1896 he was made commodore and President of the Board of Inspection and Survey. When the Spanish war broke out in 1898 he was in command of the Asiatic Squadron. He was at Mirs Bay, China, on April 27 of that year when he received orders to 'capture or destroy' the Spanish fleet commanded by Admiral Montojo, then in or near Manila Bay. It was 11:30 A.M. on April 30th that Dewey's Squadron entered the Manila Channel and early on the following day all the Spanish vessels were burnt, sunk, or captured. The American naval victory was won without the loss of a single man. On August 18, Dewey's ships assisted General Merritt in the capture of Manila. For his victory in Manila Bay Dewey received the thanks of Congress, and was awarded a sword. On May 7, 1898 he was appointed rear-admiral, and March 3, 1899 a full admiral, under a special act passed March 2 of that year. In 1901 he was President of the Schley Court of Inquiry and was appointed President of the General Navy Board. His *Autobiography* was published in 1914.

DEWEY, JOHN (1859), an American university professor, *b.* in Burlington, Vt. Graduating from the University of Vermont, in 1879, he became instructor and assistant professor of philosophy at the University of Michigan. During 1888-9 he was professor of philosophy at the University of Minnesota, after which he returned to the University of Michigan as professor and head of the department of philosophy. Since 1904 he has been professor of philosophy at Columbia University. His books are considered the most authoritative on the subjects with which they deal. Among them are *Psychology*, 1886; *A Critical Theory of Ethics*, 1894; *Psychology of Number*, 1894; *How to Think*, 1909; *German Philosophy and Politics*, 1915; *Democracy and Education*, 1916, and *Reconstruction in Philosophy*, 1920.

DEWEY, MELVIL (1851), an American librarian, *b.* in Adams Center, N.Y. He graduated from Amherst College, in 1874, and remained there for two years as acting librarian. He was chief librarian and professor of library economy at Columbia University, during 1883-8. In 1887 he founded the New York State Library School, of which he was director till 1906. He is the author of *Library School Rules*, 1891, and *Decimal Classification and Relative Index*, 1876-1919. He was the founder and for many years the editor of *The Library Journal.*

DE WITT, JAN (1625-72), Dutch statesman; pensionary of Dort; grand pensionary of Holland, 1653-72. Like his *f.* Jacob, burgomaster of Dort he resolutely opposed the house of Orange; led the Republican Anti-Stadtholder party; did much for Holland in commercial struggle with England; secured Triple Alliance with England and Sweden against France, 1668; with his bro., Cornelius, 1623-72, torn to pieces by mob on defeat of Holland by Louis XIV.

DE WOLF, FRANK WALBRIDGE (1881), an American geologist, *b.* at Vail, Ia., son of John Horton and Carrie

M. Tempest De Wolf. He was educated at the University of Chicago. He was employed by the Illinois Steel Co. as a chemist from 1899-1900. In 1904 he became assistant geologist of the United States Geol. Survey, Washington; in 1908 assistant state geologist of Illinois and the following year became director, and in 1911 director of the Illinois Geological Survey. He was also assistant director of the Bureau of Mines from Aug. 1917 to Feb. 1918.

DEWSBURY (53° 42′ N., 1° 38′ W.), market town, on Calder, Yorkshire, England; woolens; iron foundries, coal. Pop. 1921, 54,165.

DEXTER, HENRY MARTYN (1821-90), Congregationalist divine; wrote works on Congregationalism.

DEXTRIN, sometimes known as British Gum, is an intermediate product between starch and sugar, and has the formula $(C_6H_{10}O_5)n$. It occurs as an odorless, yellowish-white powder and on mixing with water forms an extremely sticky paste, finally dissolving. It is formed by heating starch to about 210° C., or by treating it with dilute acids or with diastase. It is used as an adhesive and as a substitute for gum arabic. The name dextrin arose from the fact that its solution has the power of turning a ray of polarized light to the right.

DEXTROSE, $C_6H_{12}O_6$. Also known as glucose, grape sugar and starch sugar. A carbohydrate occurring widely in nature, being a common constituent of fruit juices and forming about 45 per cent of the solid matter in honey. It occurs in small quantities in the blood and in the urine of diabetic patients. It appears on the market and is widely used, as a constituent of corn syrup and of various compound syrups. Dextrose is readily formed from cane sugar by inversion, usually brought about by boiling with dilute acids or by the enzyme, invertase. The process is one of hydrolysis, the cane sugar molecule combining with a molecule of water and splitting up into one molecule of dextrose, and one of fructose. Commercial glucose, or corn syrup, contains varying percentages of dextrose, averaging around 30 per cent of the solid matter. This product is manufactured on a large scale by boiling corn starch, under pressure, with dilute hydrochloric acid, neutralizing and filtering through carbon to remove color and objectionable flavors. Pure dextrose occurs as white amorphous lumps, or as a white powder, or may be obtained in the form of a colorless syrup.

DHAR (22° 36′ N., 75° 20′ E.), native state, Malwa, Brit. India; chief town, Dhar; rice, oil-seeds. Area, 1,739 sq. miles. Pop. 142,715.

DHARAMPUR, DHURUMPUR (20° 34′ N., 73° 14′ E.), native Rajput state, E. of Surat, Bombay, India. Area, 704 sq. miles. Pop. 100,430.

DHARMSALA (32° 22′ N., 76° 15′ E.), hill station and sanatorium, Kangra district, Punjab, India; destroyed by earthquake, 1905.

DHARWAR (15° 27′ N., 75° 3′ E.), town and district, Bombay, India; cotton and cotton manufactures. Pop. town, 31,279.

DHOLPUR (26° 42′ N., 77° 56′ E.), native state, Rajputana, India, on N. bank of Chambal; chief town, Dholpur. Area, 1,155 sq. miles. Pop. 270,000.

DHOW, lateen-rigged vessel used in Ind. Ocean, commonly associated with the slave trade.

DHRANGADRA (22° 59′ N., 71° 31′ E.), native state, Gujerat, Bombay, India; chief town, Dhrangadra; copper and brass ware. Area, 1,156 sq. miles. Pop. 75,000.

DHULIA (20° 54′ N., 74° 46′ E.), town, on Panjhra, Bombay, India; good trade in cotton and oil-seeds. Pop. 25,000.

DIABASE, tough, durable stone, a form of dolerite, with fine-grained crystalline structure; composed of same elements, viz. olivine, augite, and felspar; found in almost all parts of the world, among older rocks.

DIABETES, a disease resulting from the non-assimilation of food in the stomach, liver, kidneys, or in the blood. It is marked by excessive thirst and great bodily emaciation. Dieting and fasting, as tried during the past few years, has proven a check, rather than a cure, of diabetes. But the total number of cases has continually increased, as proved by the rejections of the Metropolitan Life Insurance Co., which was 5.7 per 1,000, in 1921, as compared to 4.5 per 1,000 in 1919. Unfortunately the fasting remedy is usually resorted to when degeneration of the pancreas has already set in, to which must be added the fact that few persons are able to adhere to a strict diet regime. In 1921 Dr. Frederick G. Banting, of the University of Toronto, made an extract of that portion of the pancreas which is destroyed by diabetes, which had the effect of checking the progress of diabetes in dogs, and decreasing the production of sugar. With this extract, known as insulin, a number of very severe cases were treated during 1922, some of them having already entered the final stage of coma, the disease being arrested in all cases. It is still too early to state positively that insulin will prove a cure for diabetes, but there seems no doubt that it can check it at a stage too late even for the dietetic treatment.

DIABLO, game in which a spool-shaped top is spun and tossed on a string attached to two sticks; originated in China; popular at beginning of XIX. and of XX. cent's.

DIACONICON, a place in apse of a Gk. church for ecclesiastical vessels.

DIADOCHI, Macedonian leaders who defended the empire of Alexander the Great after his death.

DIAGORAS OF MELOS (V. cent. B.C.), poet, denounced for his disbelief in the Gk. divinities.

DIAGRAM (in geom.), a figure consisting of points, lines, and curves drawn for the purpose of helping a reader to follow the argument used in demonstrating a geometrical proposition. Points are named by letters of the alphabet: A, B, etc. In the text, a line is referred to by the two letters naming the points which it joins: line AB, etc., and an angle by three letters, the middle one of which is always the name of the point of junction of the two lines forming the angle: angle ABC, or CBA.

DIAL, NATHANIEL BARKSDALE (1862), a U.S. senator, *b.* in Laurens County, S.C. Studying law at the University of Virginia, he began to practice, in 1883, in his native city. Here he became interested in a large number of business interests, of many of which he was president or director. During 1887-91 he was mayor. For many years he was a member of the Democratic State Executive Committee, and was repeatedly a candidate for U.S. Senator, being always defeated, however, until 1918, when he was elected for the term 1919-25.

DIALECT, a local form of a standard speech, erroneously considered a corruption. It changes less than written speech. D's have become standard literary language; East Midland d. gave English, Tuscan d. gave Italian, High German d. gave German.

DIALECTICS, logical term for the art of discussing or reasoning.

DIALOGUE, a conversation. As a literary form it was used by Plato for didactic purpose, and Dryden in his *Essay on Dramatic Poesy* follows the same method. Landor in *Imaginary Conversations* uses d. with great success.

DIAMANTINA (18° 18′ S., 43° 20′ W.), city, Brazil; diamond mines. Pop. 14,000.

DIAMOND, a mineral which consists of pure crystallized carbon, and, unlike most minerals, is found in single crystals. As a rule they are of octahedron form, but have also been found in rhombic dodecahedra and hexakis-octahedra. The color of diamonds varies, the rarest being clear like glass, and sometimes this variety is tinted with delicate hues of yellow, grey, blue, green, or red. Black diamonds are not unknown. In their virgin state the stones have a rough, dull, and uneven surface, and, in fact, workers in Brazilian gold mines regarded them as nothing more than worthless pebbles until the 18th cent., when their true value was accidentally discovered.

The diamond is so hard that it is impossible to scratch it except with another diamond. Impure crystals and fragments, which are of no use for decorative purposes, are called *bort*, and in 1476 L. von Berguen of Bruges found that this might be used for engraving and polishing perfect stones. Bort is used also for polishing and faceting other precious stones, whilst small diamonds are used for cutting glass, drilling porcelain, and as bearings for watches. *Diamond cutting*, a highly specialized art, is carried on chiefly at Amsterdam and Antwerp. Some famous diamonds are the *Koh-i-noor*, presented to Queen Victoria by E. India Co.; the *Regent* or *Pitt*, one of the Fr. crown jewels; the *Star of the South*, found in Brazil; the *Cullinan*, largest diamond of good quality yet discovered; and the *Blue Hope* diamond, supposed to bring ill-luck.

Experiments have been made (notably by Sir William Crookes, Mr. MacTear, and M. Moissan) to manufacture artificial diamonds in crucibles, and very small stones have been produced.

DIANA (classical myth.), Rom. goddess of war, the chase, and the moon; derived from the Gk. Artemis.

DIANE DE FRANCE (1538-1619), Duchess of Montmorency; natural dau. of Henry II.; *m.* Francis, *s.* of the Constable de Montmorency.

DIANE DE POITIERS (1499-1566), Duchess Valentinois; mistress of Henry II. of France, over whom she exercised great influence.

DIAPASON, Gk. term for an octave. In French it denotes musical pitch. In England name applies to certain organ stops extending throughout the whole compass of the keyboard.

DIAPER, cotton or linen cloth with woven pattern; also term in arch. for a running decoration.

DIAPHRAGM, MIDRIFF, the dome-shaped partition, partly muscular and partly tendinous, in the body between the abdominal cavity and the thoracic cavity, attached chiefly to the lumbar vertebræ and the ribs.

DIARBEKR, or **DIARBEKIR.** (1) Vilayet, Kurdistan, traversed by Upper Tigris; is mountainous; stock-raising; inhabitants mainly nomads; copper (Organi mine) is worked, also galena. Area, 14,480 sq. m.; pop. 471,500. (2) Cap. of above vilayet, on Tigris (37° 55′ N., 40° 21′ E.), formerly prosperous, with strong walls and citadel on rock 1,950 ft. high; now decayed; morocco leather, filigree work, cotton, silk, mohair, copper ore, sheep and goat skins. During the World War the town was an important base for the Turk. forces in Anatolia. Pop. 38,000 (Turks, Kurds, Arabs, Armenians).

DIARRHŒA, condition in which the contents of the bowel are being almost continuously ejected, due to some intestinal irritation, or sometimes to specific disease, (*e.g.*) cholera, typhoid fever.

DIARY, personal daily record of thoughts, experiences, or engagements. The early diarists apparently wrote merely for their own pleasure, and without reserve, having no thought of publication. The most famous diary is that of Samuel Pepys (1633-1703), written in cypher, and covering the period from 1660 to 1669; first pub. 1825. Other noted diaries are those of John Evelyn, Swift, Dr. Byron, John Wesley, George Fox, and Madame D'Arblay.

DIASTASE or **AMYLASE.** A substance, known as an enzyme, which has the property of converting starch into maltose. It occurs very widely in nature, and is found in blood serum, in muscle, liver and other parts of the body, and to a considerable extent in saliva. In the vegetable kingdom it occurs in leaves, twigs, seeds and other parts of a plant, and in yeast and many of the mould fungi. It assumes industrial importance by its action in the production of malt from barley, for the manufacture of beer, syrups and other products. The enzyme occurs in the barley grain, but the quantity steadily increases when the grain is germinated, (*i.e.*) piled in heaps, moistened and allowed to sprout. In the course of germination, the diastase acts upon the starch in the grain, and converts it to malt sugar. Diastase is prepared by a variety of methods, usually from malt. By one method, the ground malt is soaked with water for several hours, the solid matter is filtered off and the solution treated with alcohol. This causes the diastase to be thrown out of solution as a flocculent precipitate, which is then washed with alcohol and dried in vacuo. Sometimes, in place of water, dilute alcohol is used for extraction and the enzyme is frequently purified by redissolving in water and precipitating with ammonium sulphate. By any of the above methods, the diastase is obtained as an amorphous, colorless powder.

DIATOMS. Microscopical water plants, or algæ, first discovered in 1702 by Leeuwenhoek. They are found in a variety of forms, many of them of considerable beauty. They are usually either circular, oval, disc-shaped or cuneate. Under favorable conditions they multiply rapidly, but they will not grow in the dark. In ponds, on the surface of damp rocks, and in other moist places to which sunlight can gain access, they are usually plentiful. They are unicellular and usually multiply by cell-division. Over ten thousand species have been discovered and classified. Some of them frequently cause peculiar odors or flavors to develop in drinking waters, one of the commonest being the Synura, which produces a flavor of bitter cucumbers.

DIAVOLO, FRA, MICHELE PEZZA (1771-1806), Ital. brigand; committed many atrocities in kingdom of Naples; after adventures captured and shot.

DIAZ, BARON ARMANDO (1861), Ital. soldier, distinguished himself in Libya, 1912; in World War commanded a division on the Carso front; promoted commander of the 23rd Army Corps, which smashed through the Selo line on the Middle Carso, Aug. 1917. After the Caporetto disaster, when affairs were desperate, he took over supreme command; decided to stand on the weak Piave line, and made a brilliant defense, which established his reputation as one of the greatest generals of the war. By the end of June 1918 all the enemy were E. of the Piave; on Oct. 27 he attacked across the Piave, and was successful all along the line; a week later Austria surrendered. He was minister of War in the Mussolini Cabinet, 1922-.

DIAZ, NARCISSE VIRGILIO (1808-76), Fr. artist; pupil of Théodore Rousseau; woodland scenes and storms.

DIAZ, PORFIRIO (1830-1915), president of Mexico; distinguished himself against the Fr. troops sent to Mexico by Napoleon III. to uphold the claim of Maximilian, and on their departure defeated that ruler; after prolonged struggle with other candidates for the presidency, he ousted Lerdo, the successor of Juarez, and was elected to the chief office in 1877, a position which he continued to hold until 1911, except 1880-4; revolution in April 1911 drove him from the country. A man of wisdom but surrounded by 'grafters' who exploited Mexico for their own purposes.

DIAZ DE NOVAES, BARTOLOMEU (*fl.* 1481-1500), Portug. explorer; sailed to Gold Coast, 1481; first to round Cape of Good Hope, 1487, which he named 'Cape of Storms' (*Cabo Tormentoso*); name changed to 'Cape of Good Hope' by King John of Portugal; sailed as far as Great Fish River; went to Brazil, 1500; was lost in storm.

DIAZO-COMPOUNDS are peculiar to the aromatic series, and may be regarded as salts of diazobenzene ($C_6H_5N_2OH$). They are prepared by treating an amine of the benzene series with nitrous acid at low temperatures; they are highly explosive and very unstable substances. Owing to the number of reactions they take part in they are much used in synthetic work, especially in the investigation of the substitution products of the benzene series. They are of great value in the preparation of dyes, being the source of the large class of synthetic dye-stuffs known as azo-dyes. With alcohols yield hydrocarbons; warmed in aqueous solution, nitrogen is evolved and phenols formed; warmed with concentrated halogen acids, yield halogen derivatives.

DIBDIN, CHARLES (1745-1814), Eng. poet, composer, and dramatist; wrote about sixty plays and one hundred sea-songs, including *Poor Jack* and *Tom Bowling*.

DIBDIN, THOMAS FROGNALL (1774-1847), Eng. bibliographer.

DIBDIN, THOMAS JOHN (1771-1841), Eng. song-writer and dramatist; *s.* of Charles D.

DIBRA (41° 30′ N., 20° 38′ E.), fortified town, Albania. Pop. 12,000.

DIBRUGARH (27° 28′ N., 94° 57′ E.), town, near junction of Dibru and Brahmaputra, Assam, India; terminus of steam communication on Brahmaputra; coal and tea exported. Pop. 11,227.

DICÆARCHUS (*fl. c.* 320 B.C.), Gk. writer and philosopher; fragments of works survive.

DICE, small cubes having a number on each face; sum of numbers on opposite faces is 7; used in gaming; of great antiquity.

DICETO, RALPH DE (*d. c.* 1202) Eng. chronicler; dean of St. Paul's; works specially valuable for period 1172-1202.

DICHOTOMY, in botany, a system of branching in which the main axis divides again and again into two branches.

DICKENS, CHARLES (1812-70), Eng. novelist; *b.* Portsea; *s.* of poor parents, the originals of Mr. Micawber and Mrs. Nickleby. His childhood, in its general outlines, may be studied in early chapters of *David Copperfield*, in his picture of young Pip in *Great Expectations*, and in some traits of Little Dombey. Dickens was practically self-educated. As a youth he became a lawyer's clerk, but this position he relinquished for journalism. He soon made a position for himself, first as parliamentary reporter, later as a writer of sketches, collected and pub., under the title of *Sketches by Boz*, 1836; in the *Monthly Magazine*. He began the production of *The Pickwick Papers* in periodical numbers in 1836, and practically the whole of the reading public of England fell under the sway of *Pickwick*. This work was followed by *Oliver Twist*, 1837; *Nicholas Nickleby*, 1838; *Old Curiosity Shop* and *Barnaby Rudge*, 1840; *Martin Chuzzlewit* and *A Christmas Carol*, 1843; *Dombey and Son*, 1846; *David Copperfield*, 1849; *Bleak House*, 1852; *Tale of Two Cities*, 1859; *Great Expectations*, 1860; *Our Mutual Friend*, 1864; *Edwin Drood*, 1870—the latter unfinished—and several other works. Besides novel-writing, Dickens edited the magazines *Household Words* and *All the Year Round*, and gave readings from his works, which realized large sums. In 1842 he visited the U.S. His *American Notes*, 1842, gave much offense to Americans.

Though Dickens was one of the greatest realists in picturing, with inexhaustible truth of detail, the surroundings and conditions of life in his time, his genius was essentially humorous and fantastic. He used his knowledge of human nature as material for creative work, and his poetic imagination found free scope not only in fantasies like *The Chimes* and *A Christmas Carol*, but still more in wonderful beings such as Quilp, Mrs. Gamp, the Wellers, and Mrs. Micawber. Much stronger than his conscientious fidelity to the life he observed was the creative and transforming impulse that affected his actual vision. A *Dickens Fellowship*, with many local branches, was established in 1902 to emulate his virtues and to keep his memory green.

DICKENS, JOHN LUNSFORD (1853), an American college president, *b.* at Gibson co., Tenn., *s.* of Robert Gilliam and Mary Malvina Dickey Dickens. He was educated at Bethel College, Tenn., Cumberland University and McKendree College, Ill. He was ordained a Presbyterian minister in 1876 but did not have any regular charge until 1894, however from then until 1918 he was the pastor of various churches in Tenn., Ky., Miss. and Texas. He was at one time president, Trinity University, Tex., Texas Female Seminary, Quanah College, Bethel College and also president and owner of Asgard College for Young Ladies, South Houston, Texas, and president of South Houston State Bank. In 1918 he became President of the Houston Bible Institute.

DICKINSON, ANNA ELIZABETH (1842), American author and lecturer on reform.

DICKINSON COLLEGE, a co-educational institution in Carlisle, Pa., founded in 1783 by the Presbyterians. In 1833 it came under the influence of the Methodist-Episcopal Church. Its student body in 1921-22 numbered 460 and its faculty 22, and there were 34,000 volumes in its library. It has a yearly income of about $50,000.

DICKINSON, DON M. (1846-1917), an American politician and public official, *b.* in Port Ontario, N.Y. He studied law and for several years practiced in Detroit and Washington. He took a prominent part as a Democrat in the Greeley campaign of 1872 and the Tilden campaign of 1876, and was one of the leaders of the party in New York. From 1887 to 1889 he was postmaster general, and in 1892 was chairman of the Democratic National Campaign Committee. He was senior counsel for the United States in the fur seal arbitration of 1896-7, and was one of the American members of the court of arbitration in the controversy between the United States and Salvador, in 1902.

DICKINSON, EMILY (1830-1886), an American poet, *b.* in Amherst, Mass. During her life she attracted very little attention and published almost nothing, but the year following her death *Poems by Emily Dickinson,* edited by T. W. Higginson and Mrs. Mabel Loomis Todd, appeared and attracted wide attention. Because of this success a second volume was issued, followed in 1906 by a volume of letters.

DICKINSON, GOLDSWORTHY LOWES, an English writer, the son of the late well-known artist, Lowes Dickinson. He was educated at Cambridge and immediately began a literary career. His *Letters of a Chinese Official,* published in this country under the title *Letters of John Chinaman,* a gentle satire, were taken so seriously by William Jennings Bryan that he replied to them in *Letters to a Chinese Official.* Among others of his works are *The European Anarchy* 1916; *The Choice Before Us,* 1917, and *The Magic Flute,* 1920.

DICKINSON, JACOB MC GAVOCK (1851), an American lawyer and ex-Secretary of War, *b.* in Columbus, Miss. Graduating from the University of Nashville, in 1871, he studied law at Columbia College, in New York, and later in Paris and Leipzig, Germany. He began to practice in Nashville, Tenn., in 1876, going to Chicago in 1899. During 1895-7 he was Assistant Attorney-General of the U.S., and was counsel for the United States before the Alaskan Boundary Tribunal, in 1903. From 1909 till 1911 he was Secretary of War in President Taft's Cabinet. He was receiver of the Rock Island railroad lines during 1915-17.

DICKINSON, JOHN (1732-1808), Amer. politician; studied law in England; held office in Delaware and Pennsylvania; adverse to Declaration of Independence.

DICKMAN, JOSEPH THEODORE (1857), an American soldier, *b.* in Dayton, O. He graduated from the West Point Military Academy, in 1881, and from the Infantry and Cavalry School, in 1883; participated in the campaign against the Indians, under Geronimo, during 1885; served under General Wheeler in the Cuban Campaign, in 1899, and against the Aguinaldo insurgents in the Philippines, in 1899-1900. In the following year he was Gen. Chaffee's chief of staff in the relief expedition sent to Peking, China. During the war against Germany he was for a while in command of the Third Division of the American Expeditionary Forces in France. In 1921 he was retired, with the rank of major-general.

DICKSON CITY, a borough of Pennsylvania, in Lackawanna co. It is on the Delaware and Hudson Company, and the New York, Ontario and Western railroads. It is an important industrial community and has foundries, silk mills, and machine shops. In the neighborhood are important coal mines. Pop. 1920, 11,049.

DICKSON, SIR ALEXANDER (1777-1840), Eng. general; principal artillery officer at *Quatre Bras* and *Waterloo.*

DICKSON, HARRIS (1868), an Amer.

author, *b.* in Yazoo City, Miss. Beginning with only a public school education, he later attended summer classes at the University of Virginia, studied law and began to practice in Vicksburg, Miss. During 1905-7 he was judge of the municipal court. Among his books are *The Black Wolf's Breed*, 1899; *The Siege of Lady Resolute*, 1902; *Old Reliable*, 1912; *The Coffin Club Stories*, 1913, and *An Unpopular History of the United States*, 1917.

DICTATOR, in ancient Rome, one who was invested with special powers in an emergency when authority of consuls was not thought sufficient; like a temporary absolute monarch; Sulla and Julius Cæsar were d's.

DICTIONARY, a list of all or most of the words of a language, with their meanings, pronunciations, and origin arranged in alphabetical order. It is also now generally applied to works, arranged on similar lines, dealing with biography, dates, geography, theology, science, and numerous other subjects. An etymological dictionary is one in which the history and derivation of words is made the principal object. A glossary differs from a dictionary in being a list of dialectal, obsolete, foreign, or unusual words. Apparently the earliest dictionary of which there is any trace was the Homeric Lexicon (*Lexeis Homerika*) compiled by Apollonius, a grammarian of the age of Augustus. Latin lexicography was inaugurated by the *Thesaurus Linguoe Latinoe* of Robert Estienne, Paris, 1531. Another famous early dictionary was Bayle's *Dictionnaire Historique et Critique*, 1697. Other noted works of the kind are the Ital. *Vocabulario della Crusca*, 1612; that pub. by Fr. Academy, 1694; the Madrid Academy, 1726-39; and the great Ger. work of the Grimm brothers, commenced in 1854. The first Eng. dictionary worthy of the name was that compiled by Nathan Bailey, 1721, which formed the basis of the better-known work of Dr. Samuel Johnson, pub. in 1755. Webster's *Dictionary* was first issued in 1806, and then to the present time, while the late Sir James Murray's *New English Dictionary* is still in course of publication. The output of dictionaries has been enormous.

DICTOGRAPH, a modification of the cylinder phonograph, used to record literary productions or correspondence so that they can be reproduced at will. Two machines are used, one a recorder having an attached mouthpiece into which the dictator speaks while making the record; the other a reproducer, fitted with ear pieces and flexible tube connections for use of the person transcribing the recorded matter. Both machines are equipped with stops, so that the record may be interrupted when desired. The advantages of a system which permits dispensing with stenographers, and recording dictation at any time, with subsequent routine typing, have caused its installation in many offices.

DICTAPHONE, an instrument which is made up of an ordinary telephone circuit to which is attached a transmitter sensitive enough to take up the words of persons conversing in the room so that they can be heard and recorded on the telephone. The transmitter is usually small enough so that it can be concealed in some part of the room in which it is used. The dictaphone has been used extensively in recent years to gather evidence by detectives and others. It also has a practical use in the reproduction of sounds in different parts of halls and rooms. It has been installed in the waiting rooms of railway stations where the announcer has his voice megaphoned by telephone receivers located in various parts of the building.

DICTYS OF CRETE, supposed author of a contemporary description of the Trojan War, now existing in Latin version.

DIDACHÉ, THE, name given to an early Christian moral treatise, also called *The Teaching of the Twelve Apostles*, the MS. of which was discovered at Constantinople, 1873.

DIDEROT, DENIS (1713-84), Fr. author and encyclopædist; refused to adopt either the law or med. as profession. After producing much work of a varied but ephemeral character, he was app. to the editorship of a projected Encyclopædia, the first vol. of which was pub. in 1751, and the last in 1772. During some portion of this long period he was assisted by D'Alembert, but a great part of it was written by himself. D. also wrote plays, novels, philosophical works, and art criticisms; he was one of the greatest thinkers, writers, and conversationalists of the XVIII. cent.

DIDIUS SALVIUS JULIANUS, MARCUS, Rom. emperor for brief period during year 193 A.D.; supplanted by Septimius Severus.

DIDO, ELISSA, queen and reputed founder of city of Carthage. Æneas visited the city and fell in love with D.; on his departure she slew herself.

DIDYMI, DIDYMA, temple of Apollo, near Miletus, Asia Minor; its priests were the *Branchidoe*, traditional descendants of Branchus; destroyed by Xerxes, 481 B.C.; restored later; collapsed about XV. cent., owing to earthquake. Explorations have revealed the finest temple ruin in Asia Minor.

DIDYMIUM. The name given by Mosander in 1842 to a supposed new element separate from the cerite earths. In 1885, however, Auer von Welsbach showed that didymium consisted of a mixture of two elements, to which were given the names neodymium and praseodymium. These two metallic elements resemble one another closely, but the salts of praseodymium are green and those of neodymium pink. Praseodymium has a yellowish color, melts at 940° C. and has a specific gravity of 6.475. It is not affected by the air. Neodymium has a similar appearance, but tarnishes slowly in the air. It melts at 840° C. and has a specific gravity of 6.956. Both metals are rare and of little commercial importance.

DIDYMUS, CHALCENTERUS, Gk. grammarian and scholar of the age of Augustus.

DIE. See ENGRAVING.

DIE, ST. See VOSGES.

DIEBITSCH, HANS KARL FRIEDRICH ANTON, COUNT DIEBICH-ZABALKANSKY (1785 - 1831), Russian field-marshal; wounded at *Austerlitz*; distinguished himself in Russo-Turk. War, 1828-29; *d.* in Polish campaign.

DIEDENHOFEN (49° 21′ N., 6° 9′ E.), fortified town, on Moselle, Alsace Lorraine, France; railway junction; vines and fruit. Pop. 11,930.

DIEKIRCH (49° 52′ N., 6° 9′ E.), small town, on Sûre; one of the three ministrative centers of Luxemburg; tour center. Pop. 3,900.

DIELECTRIC, or **INSULATOR,** according to Faraday, is the name given to those substances through which electrostatic induction takes place. When one body attracts another, (*viz.*), a molecule of dust, the action which takes place is called induction, and the intervening medium in which the action occurs is called the D. There are two kinds of D., the one is gaseous and includes air and all gases, the other is solid and includes such substances as glass, silk, vulcanite, resin, mica, and gutta-percha. Brass and all metals are good conductors of electricity, while porcelain, marble, slate, and stoneware are such bad conductors that they are used for insulating telegraph and telephone supports, or the bases of switchboards or stands, etc. In the same way the softer substances, silk, gutta-percha, and india-rubber, are used for insulating telegraph and telephone wires, or coils and wires in other electrical apparatus. The inductive effect of a given charge depends upon the D. surrounding the charged body, and the result obtained is called the specific inductive capacity. When hot, the power of a body is always diminished. Although air is a D., should an electric spark pass through it, its insulating power at once breaks down, and it ceases to act as a D. In the same way solid D's. lose their solidity and become cracked, if touched by an electric spark.

DIELMAN, FREDERICK (1847), a German-American artist, *b.* in Hanover, Germany. He came to this country as a child, was draughtsman in the U.S. Engraving Department, during 1866-72, then studied art under Diez at the Royal Academy of Munich. In 1876 he opened a studio in New York as an illustrator and figure painter. From 1903 till 1918 he was professor of art at the College of the City of New York, and since 1905 has been art director of Cooper Institute in New York City. Among his most notable works are the mosaic panels of *Law* and *History* in the Congressional Library; the decorations in the new building of the Washington Evening Star and six mosaics in the State Capital of Iowa, in Des Moines.

DIEMEN, ANTHONY VAN (1593-1645), Dutch admiral and administrator Tasmania was originally named after him, *Van Diemen's Land*, as he was instrumental in sending out Tasman's expedition.

DIEPENBECK, ABRAHAM VAN (1599-1675), Flem. artist; pupil of Rubens; noted for window-paintings and portraits, etc.

DIEPPE (49° 56′ N., 1° 5′ E.), seaport, Seine-Inférieure, France, on Eng. Channel, at mouth of Arques; fashionable watering-place; an important port for passenger traffic with England; contains castle, now barracks; Church of St. Jacques, XIII. cent. There is a fine commodious harbor, enlarged 1911; active foreign trade; important fisheries; shipbuilding; ivory work. D. was bombarded by Eng. and Dutch, 1694. Important naval station during World War. Pop. 25,000.

DIESEL ENGINE, a type of internal combustion engine using as a fuel, heavy low grade oils. This engine was first proposed by Rudolf Diesel, a German, in about 1900, its great possibilities, however, were not realized until after the death of the inventor in 1913. Its high efficiency and simple construction have appealed greatly to engine users and have caused its rapid development and subsequent use, not only on land but also on certain classes of sea-going vessels. While units as large as 2,400 H.P. have been used in some marine installations, the high efficiency of large steam turbines has fixed about 100 H.P. as the economical limit of size in the average land installation. The speed of a Diesel engine is inherently higher than that of most large reciprocating steam engines, which renders it better fitted for driving the present designs of electric generators. This characteristic has been utilized to advantage in some marine Diesel-Electric drives, and in many land stations, particularly in isolated locations, and where heavy oils are cheap and abundant. The Diesel engine operates on a four phase cycle (commonly called four cycle), the object being to bring about combustion of the fuel, and therefore the application of heat at or near constant temperature. The cycle is as follows: A charge of air flows into the cylinder during the aspiring stroke, where it is compressed (without much loss of heat) to a very high pressure, during the compression stroke. The inlet valve is now opened and the oil fuel is forcibly injected into the cylinder, where it immediately becomes ignited, due to the high temperature of the air, caused by the high precompression. Combustion now takes place at approximately constant temperature, the piston advances, and the expansion of the gases, up to the point where the fuel is cut off is nearly isothermal. From this point up to the point where the exhaust valve opens, the temperature of the gases falls off. The exhaust valve now opens and the pressure falls off to that of the atmosphere, the expulsion stroke takes place, and the cycle starts anew. The four phase cycle makes necessary the use of a relatively large and heavy flywheel to give a minimum torque and speed variation during a cycle. While the cylinders of this engine must operate at a comparatively high temperature, water cooling is resorted to, to some extent to prevent overheating of the parts. It is necessary to start these engines by revolving them by some external source of power; when the temperature at the end of the compression stroke is great enough, the fuel is turned on, and the engine runs under its own power. The weak points of the engine are, its heavy flywheel, its nonreversibility and the necessity of external power for starting. Some of these objectional features are eliminated in some of the recent 'semi-diesel' engines.

DIESEL, RUDOLF (1858-1913), a German inventor, *b.* in Paris, France. He was educated, first in England, then in Munich, Germany, later being manager of a refrigerating plant in Paris. Here he began experimenting in mechanics, being especially interested in perfecting an internal combustion engine. By 1893 he had attracted considerable attention, and in 1897 he first produced the engine which has since been associated with his name, and which had so important a part in the World War as the motive power of the German submarines. In 1912 he came to the United States to deliver a series of lectures, and while here received an invitation from the British Admiralty to come to London for a conference. He was drowned in the English Channel while on the way to the proposed interview. He wrote a great deal on mechanics, his best known book being *Theory and Construction of a Rational Heat Motor*.

DIES IRÆ ('Day of Wrath'), famous Lat. hymn on the Day of Judgment; attributed to the Franciscan friar Thomas de Celano, *c.* 1255; has held its place in the Mass since its insertion by Council of Trent; set to music by Haydn, Mozart, and others.

DIET, word used in English to describe certain continental assemblies, (*e.g.*), the *Reichstag* of the Holy Rom. Empire. Its origin is to be found in the Teut. *folk-moot*, and then in the assemblies of the Franks. It was, however, a select number of princes rather than the whole body of men that became important, hence the mediæval d. included generally only nobles.

DIETETICS, the science of food and feeding of man in health and in disease. Food is required for building up and repairing tissues, and also as a fuel to provide heat and energy, and different substances contained in food fulfill these different functions. Food is composed both of organic and of inorganic matter, the former including *proteins*, albuminous substances (*e.g.*) the flesh of meat, white of egg; *carbohydrates*, sugars and starchy substances, and *fats*, animal or vegetable fats and oils; while the latter include *mineral salts*, sodium chloride or common salt, phosphates, etc., and *water*. The substances which build and repair tissue are the proteins, the mineral salts, and water; while those which provide heat and energy are the fats, the carbohydrates, and the proteins.

The value of any food as nutrition to the body depends on several facts; the proportion of proteins, carbohydrates, and other substances present;

the amount of heat it is able to produce; and the proportion of actually nutritive substances it contains, and the ease with which these are absorbed by the tissues.

The amount of food required naturally varies with different individuals under different conditions, but exhaustive investigations show the minimum dietary required by a normal adult man under moderate conditions of muscular work. Such a man excretes 16-20 grammes of nitrogen and about 320 grammes of carbon every day, and the daily amount of nutritive substances required for such a loss is 125 grammes of protein, 500 grammes of carbohydrate, 50 grammes of fat, the sum of which on analysis will be found to contain 20 grammes of nitrogen and 300 grammes of carbon, while the calorimeter shows that it will produce just over 3,000 calories or units of heat. To provide the proper quantities of the above substances a mixed diet is necessary, as no single food has the correct proportion, and a suitable daily diet has been shown to be 1 lb. of bread, ½ lb. of meat, ½ lb. of fat, 1 lb. of potatoes, ½ pint of milk, ¼ lb. (or 2) eggs, ⅛ lb. cheese. A man doing severe muscular work requires a greater amount of food than the above—enough to produce 4,500-5,000 calories. See Foods.

DIETRICH, CHRISTIAN WILHELM ERNST (1712-74), Ger. artist.

DIFFERENTIAL. See Automobile.

DIFFERENTIAL CALCULUS. See Calculus.

DIFFRACTION. See Light.

DIFFUSION (Physics).—If water be very slowly poured on top of a solution of a salt (*e.g.* copper sulphate), so as to cause no mixing, and the liquids be then left alone, it will be found that the heavier salt solution will slowly rise and the lighter liquid sink, until the strength of solution is the same throughout. This process, called *diffusion*, takes place with gases of different densities as well as with liquids, but the d. of the former is very rapid as compared with that of the latter, which is extremely slow; ¾ grm. of common salt will diffuse across a sq. cm. in a day.

DIGAMMA, obsolete Gk. letter, called 'vau,' shaped like an English F and pronounced as *v-w*; disappeared from alphabet *c.* 550 B.C., in some places as early as VII. cent. B.C.; was used in Homeric poems.

DIGBY, SIR EVERARD (1578-1606), Eng. conspirator; became a Roman Catholic *c.* 1599; joined in Gunpowder Plot, and was executed.

DIGBY, SIR KENELM (1603-65), Eng. soldier and author; *s.* of Sir Everard D., privateer; imprisoned for Royalist intrigues, 1642; helped to found Royal Society.

DIGEST, legal term for matter arranged under headings; an alphabetical index to cases, with succinct rules for each case.

DIGESTION, the series of changes which food undergoes in the interior of an animal so that it is capable of being absorbed and thus nourishing the body.

The mouth is provided with teeth—incisors and canines for biting and cutting the food in pieces, and premolars and molars for grinding it down so that it can be more easily swallowed. Six salivary glands, arranged in three sets of pairs—the sublingual under the tongue, the submaxillary under the angle of the lower jaw, and the parotid in front of the ear—pour their secretion into the mouth.

The cavity of the throat, or pharynx, is separated from the mouth by the soft palate above and somewhat in front, the so-called pillars of the fauces on each side, and the tonsils behind the pillars. Like the mouth, the pharynx is lined with smooth mucous membrane. Above, it is in connection with the nasal cavity, which is shut off, during swallowing, by the soft palate; while below it is continued as the œsophagus or gullet, the trachea or windpipe passing in front of the œsophagus and communicating with the pharynx by the larynx, the cavity containing the voice organ. The opening is protected by the epiglottis, a little projection over which the food slips during the act of swallowing.

The œsophagus, or *gullet*, a tube about 10 in. long in the normal adult, connect the pharynx with the stomach. It has strong muscular walls, and is lined with mucous membrane which secretes viscid mucus, and is thrown into longitudinal folds.

The *stomach* is the most dilated part of the digestive system, and is the receptacle for the food after it has been masticated and swallowed. Its shape naturally alters with the degree of its distension, but when moderately distended it is pear-shaped, curved upon itself. It is situated on the left side, at the upper part of the abdomen, just below the diaphragm, which is between it and the heart and left lung. It has a muscular coat, the fibres of which are arranged longitudinally, circularly, and obliquely, and is lined with mucous membrane thrown into numerous folds and containing a great number of glands which secrete the digestive juices. The sub-mucous tissue between the muscular coat and the mucous membrane has a great number of little blood-vessels to supply the stomach generally, and especially its numerous glands, with nourishment. Its farther, or pyloric, end leads into the small intestine.

The *small intestine* is divided into three parts—the upper, the *duodenum*; the middle, the *jejunum*; and the lower, the *ileum*. The mucous membrane which lines the small intestine is thrown into permanent folds in the form of crescents or complete rings going transversely round the interior, diminishing in number and in prominence in the lower part. These are called the *valvulae conniventes*, and they increase the absorbing and secreting surface area of the mucous membrane. Over the whole of the interior surface, on the valvulæ and between them, are little projections called *villi*, present in enormous numbers, but less in size and number low down in the intestine, their function being to absorb the digested food. In the wall of the intestine there are scattered masses of lymphoid tissue, called solitary glands, which, however, are not glandular at all, their functions being probably connected with the blood. These solitary glands are here and there aggregated together, forming patches of lumphoid tissue called *Peyer's patches*; solitary glands and Peyer's patches are found in greater abundance in the lower part of the intestine.

The mucous membrane also contains glands in great numbers which secrete the digestive fluid of the intestine.

Besides the secretion of these smaller glands there are poured into the upper part of the small intestine the secretion of the liver, or bile, and the secretion of the pancreas, or pancreatic juice. The bile is conveyed from the liver by two ducts, and a greater part of it passes through another duct, termed the cystic duct, to the gall-bladder, where it is stored.

From the gall-bladder it passes to the duodenum by way of the common bile-duct, which is joined just as it enters the intestine by the duct conveying the pancreatic juice from the pancreas.

After passing through the small intestine, the food, mixed as it is with digestive juices, passes into the *large intestine* through a valve termed the ileocæcal valve, which prevents its going back. The large intestine is short compared with the small intestine, but its diameter is greater. The internal surface is smooth, and lined with mucous membrane, with the openings of numerous Lieberkühn's glands on its surface, while villi are absent. The large intestine is best considered under several divisions: the cæcum, the saccular dilatation of the intestine beyond the ileo-cæcal valve, into which opens the narrow blind tube called the vermiform appendix; the ascending colon, going up on the right side as far as the liver; the transverse colon, extending right across the front of the upper part of the abdominal cavity; the descending colon, going vertically downwards on the left side; the iliac colon, a short portion curving into the pelvis; the pelvic colon, a long loop of intestine in the pelvis; and, lastly, the rectum, which is a dilated part just above the opening of the intestine on the surface. The anus, which is the part actually opening on the surface, is usually kept closed by the strong circular muscles which surround it.

DIGIT (Lat. *digitus*, a finger), a word used to signify any symbol of number, from 0 to 9. Thus 4629 is a number of four D's. Originally, the term was only applied to the actual numbers 1, 2 ...9, but by practice has come to signify the characters of the numbers.

DIGITALIN, a poisonous alkaloid, is obtained from *Digitalis purpurea*, the foxglove, and kindred plants. It is used in medicine in a variety of forms.

DIGITALIS, a plant of which the common foxglove is a variety, native chiefly of southern Europe, but universally grown as an ornamental plant in gardens. It has large, purple, bell-shaped flowers. The leaves, which are plucked during the second year of growth, are much valued in medicine as a heart stimulant, though in unregulated doses it is a strong narcotic poison. On account of its varying effects on different persons it has to be used with extreme caution.

DIGNE (44° 5′ N., 6° 14′ E.), town, Basses-Alpes, France; the ancient *Dinia*; bp.'s see; cathedral; preserved fruits and confections. Pop. 7,250.

DIJON (47° 21′ N., 5° 2′ E.), fortified town, Côte d'Or, France; has Gothic cathedral and several fine churches; Hôtel-de-ville, formerly ducal palace; Palais-de-Justice, XV. cent.; univ., schools of art and music. D. came under Dukes of Burgundy XI. cent., and for cent's was their capital; bombarded and occupied by Prussians, 1870. D. is important railway junction, lies on Canal de Bourgogne; center of Burgundy wine industry; liquor, beer, mustard, candles, wool, market produce. Pop. 75,000.

DILEMMA, logical term indicating two suppositions, either of which lead to an unacceptable result; the suppositions are called 'horns of the d.'

DILKE, SIR CHARLES WENTWORTH (1843-1911), English Liberal politician; M.P. for Chelsea, 1868-86; under-secretary for foreign affairs, 1880-2; president Local Government Board, 1882-5; appeared as co-respondent in a divorce case in 1885, thereby ruining a political career of the highest promise; re-entered Parliament, 1892, as member for Forest of Dean. Dilke was proprietor of the *Athenalum* and *Notes and Queries*, and author of *Greater Britain*, 1868; *Problems of Greater Britain*, 1890; and, with Mr. Spenser Wilkinson, *Imperial Defense*, 1897, and *The British Empire*, 1899.

DILLINGHAM, WILLIAM PAUL (1843-1923), a United States senator, *b.* at Waterbury, Vt., *s.* of Gov. Paul and Julia Carpenter Dillingham. He received an academic education. In 1867 he was admitted to the bar from which time he engaged in the practice of law at Montpelier, Vt. He was State's Attorney of Washington County, Vt. from 1872-6; secretary of civil and military affairs 1866 and again 1874-6; member of the House of Representatives, 1876, 84. Senate, 1878, 80, and commissioner of state taxes from 1882-8. In 1888 he was elected governor of Vermont and in 1900 was elected U.S. Senator for the unexpired term of Justin S. Morrill, deceased, and was afterwards re-elected for four terms 1903-7. He was also president of the Waterbury National Bank.

DILLON, ARTHUR RICHARD, Catholic prelate of Irish descent; bp. of Evereux, 1753; abp. of Toulouse, 1758, of Narbonne, 1763; emigrated, 1790.

DILLON, EMILE JOSEPH (1864), Brit. author and journalist; studied at various foreign universities; foreign editor of *Odessa Messenger*, 1888; special correspondent of the *Daily Telegraph* in Armenia, Spain (Span.-Amer. War), in France (Dreyfus case), China, and Russia; an authority on foreign affairs and constant contributor to the Reviews.

DILLON, JOHN (1851), Irish statesman; M.P. for Tipperary, 1880-3, and for E. Mayo, 1885-1918; active promoter of the Land League, the National League, the 'Plan of Campaign,' the 'No Rent' Manifesto, and the United Irish League; declared against Parnell's leadership after the O'Shea divorce case; chairman of the M'Carthy section of the Irish party, 1896-98; in 1901 accepted Mr. John Redmond's leadership, and on his death, 1918, succeeded him as chairman of the Irish Nationalist party; lost his seat at the general election of Dec. 1918.

DILLON, MARY, an Amer. authoress, *b.* at Carlisle, Pa., daughter of Herman Merrills (president of Dickinson College) and Lucena Elizabeth Clarke Johnson. In 1877 she married Patrick Dillon of St. Louis who died two years later. She was the author of: *The Rose of Old St. Louis*, 1904; *In Old Bellaire*, and *The Leader*, 1906; *The Patience of John Morland*, 1909; *Miss Livingston's Companion*, 1911; *Comrade*, 1917; *The American*, 1918, and *The Farmer of Roaring Run* in 1920.

DILNOT, FRANK A. (1875), a newspaper man, *b.* at Hampshire, England, *s.* of George and Elizabeth Ann Baker Dilnot. He began as a newspaper reporter in 1896 and after being on the staffs of various London newspapers, meanwhile visiting the U.S., Canada, France and Russia, he became editor of the Daily Citizen in 1912. In 1916 he was sent to Scandinavia by the Daily Chronicle to investigate social and economic conditions and was later New York correspondent for that paper. He became editor of the London Globe in 1919. He was regarded as an authority on social and economic conditions in England and was the author of *The Tyrants of Hyben*, 1904; *The Old Order Changeth*, 1912; *Lloyd George, The Man and His Story*, 1917; *The New America*, 1919 and others.

DIMITY, cotton cloth, used for curtains and hanging, either white or figured.

DIMORPHISM. See BOTANY, ZOOLOGY.

DIME, silver coin of U.S., value 10 cents (tenth part of a dollar); approximately equivalent to five pence in Eng. money.

DINAJPUR (25° 38′ N., 88° 41′ E.), town and district, Rajshahi division, Bengal, India. Pop. 14,000. District: area, 3,946 sq. miles. Pop. 6,000,000.

DINAN (48° 27′ N., 2° 2′ W.), health-resort, Côtes-du-Nord, France; chief buildings, churches of St. Malo and St. Sauveur; leather and canvas manufactured; trade in grain, cider, and agricultural produce. Pop. 12,000.

DINANT, historic tn., prov. Namur, Belgium (50° 16′ N., 4° 54′ E.), on r. bk. of the Meuse, at the base of limestone cliffs (caves) on which stands a dismantled citadel; important in the Middle Ages; in 15th cent. had pop. of 60,000 and employed 8,000 workers in chased copper and brass work ('dinanderies'); besieged and captured in 1466 by Charles the Bold, who destroyed the whole male population, 'Sack of Dinant'; plundered by French in 1554, and captured by them in 1675. At the opening of the World War the citadel was captured by the Germans and gallantly recaptured by Fr. troops. On Aug. 15, 1914, Ger. cavalry, which had advanced through the Ardennes, made a bold but unsuccessful attempt to capture the town. On Aug. 23 a battle was fought along the Meuse, above and below Dinant, with the result that the Fr. lost their hold on the river-line and were forced to retreat S., leaving Belgium in the hands of the invaders. Dinant was wantonly bombarded; the fine old church of Notre Dame, at the foot of the cliffs, was gravely damaged, and many of the inhabitants were murdered in cold blood. The place remained in Ger. hands until the Armistice, Nov. 11, 1918. Pop. 8,000.

DINAPUR (25° 38′ N., 85° 5′ E.), town, on Ganges, Patna district, Bihar and Orissa, India; military cantonment. Pop. 33,699.

DINARCHUS (*d.* 290 B.C.), celebrated Attic orator.

DINARD (48° 38′ N., 2° 2′ W.), seaport and watering-place, Brittany, France. Pop. 4,800.

DINDIGAL (10° 21′ N., 78° E.), town, Madura district, Madras, India; fortress formerly of strategical importance; tobacco exported. Pop. 25,182.

D'INDY, PAUL-MARIE-THÉODORE-VINCENT (1851), Fr. composer; disciple of César Franck.

DINGHY, rowing boat used by yachtsmen and in Navy; term originally signified small flat-bottomed craft, square at one end, now used loosely of any boat up to 14 ft. in length.

DINGLEY, NELSON (1832-1899), an American legislator, *b.* in Durham, Me. He graduated from Dartmouth College, in 1855, after which began to practice law in Lewiston, Me., becoming also proprietor and editor of the Lewiston Journal. In 1861 he was elected on a Republican ticket to the state legislature, of which he was speaker during 1864-5. In 1873 he was elected governor of the state, and re-elected in 1874. From 1881 until his death he represented his state in Congress, where he became known as an ardent protectionist, and especially of the Dingley Tariff Bill, of 1897.

DINGO. See Dog Family.

DINGWALL (57° 36′ N., 4° 27′ W.), chief town of Ross and Cromarty, Scotland; remains of ancient castle: monument to Sir Hector MacDonald.

DINKA, negro tribes occupying districts in neighborhood of White Nile; chiefly herdsmen.

DINOCERAS, extinct mammal (suborder Amblypoda), approaching rhinoceros and elephant in size, with strong limbs and short, stumpy, five-toed feet. *D. mirable*, from Eocene of Wyoming, U.S., about 10 ft. long.

DINOCRATES, Gk. architect, patronized by Alexander the Great; designed city of Alexandria.

DINOSAUR. See Reptiles.

DINOTHERIUM. See Elephant.

DINWIDDIE, ROBERT (1693-1770), lieut.-gov. of Virginia, 1751-58; precipitated Fr. and Ind. War.

DIOCESE, district presided over by a bp.; used in ecclesiastical sense since IX. cent.; word originally used for one of twelve civil divisions of Empire under Diocletian.

DIOCLETIAN, GAIUS AURELIUS VALERIUS DIOCLETIANUS (245-313 A.D.), Rom. emperor, 284-305; reorganized Empire under two *Augusti* and two *Caesars*; conducted the last great persecution of Christians; abdicated. His era is called *Era of Martyrs.*—Edict of D., issued 301 A.D. to regulate price of food and wages; preserved in Gk. and Latin fragments in various places.

DIODATI, GIOVANNI (1576-1649), Swiss Prot. theologian; prof. of Hebrew at Geneva, 1795; strong Calvinist; translated Bible into Italian and French.

DIODORUS CRONUS (IV. cent. B.C.), Gk. philosopher of Megarian school.

DIODORUS SICULUS, Gk. historian; *fl.* in times of Julius Cæsar and Augustus; wrote history of world from Creation to Cæsar's Gallic wars.

DIODOTUS, Bactrian satrap who rebelled against Antiochus II.

DIOGENES (*c.* 412-323 B.C.), Gk. 'cynic' philosopher; said to have lived in a tub; believed in enduring pain and doing without pleasure.

DIOGENES APOLLONIATES (*c.* 460 B.C.), Gk. philosopher of Ionic school; fragments of writings preserved.

DIOGENES LAERTIUS (II. cent. A.D.), Gk. historian, and biographer of Gk. philosophers.

DIOGENIANUS, Gk. grammarian of Hadrian's reign.

DIOGNETUS, EPISTLE TO, anonymous document of II. cent., describing the ideal life of the early Church.

DIOMEDES, king of Argos; fought against Troy; figures in *Iliad*.

DIOMEDES (IV. cent. A.D.), Rom. grammarian.

DION (*c.* 408-353 B.C.), follower of Plato; banished from Syracuse by Dionysius the younger, he returned and captured the city; assassinated.

DION CASSIUS (*b.* 155 A.D.), Rom. historian; wrote the *History of Rome* to the period of Agrippa's death, 10 A.D.

DION CHRYSOSTOMUS (50-117 A.D.), Gk. rhetorician; called the 'Golden-mouthed'; his orations, written in Attic Greek, were distinguished by a clear and eloquent style.

DIONE (classical myth.), *d.* of Uranus and Ge in some accounts, of Oceanus and Tethys in others; wife of Zeus, and mother of Aphrodite.

DIONYSIUS (*d.* 367 B.C.), tyrant of Syracuse; cruel despot.

DIONYSIUS, 'The Younger,' tyrant of Syracuse; *s.* of above; succ. his *f.* 367; in turn supplanted by Dion.

DIONYSIUS, ST. (*d.* 268), pope, 259, after see had remained vacant for a year owing to persecution.

DIONYSIUS AREOPAGITICUS (*Acts* 13^{34}), an Athenian converted by St. Paul; name later attached to certain writings of which there are traces *c.* 500 A.D.; they are: *Concerning the Celestial Hierarchy*, *Concerning Divine Names*, *Concerning Mystic Theology*.

DIONYSIUS OF HALICARNASSUS, Gk. rhetorician and historian of the age of Augustus; one of the greatest of Gk. literary critics.

DIONYSIUS TELMAHARENSIS, patriarch of Syrian Jacobite Church, 818-48; first a monk; wrote *Annals*, now lost, and a *Chronicle*.

DIONYSUS (classical myth.), called by the Latins *Bacchus*, was the god of wine and revelry; *s.* of Zeus and Semele.

DIOPHANTUS, Gk. algebraist of Alexandria; lived probably during III. cent.; supposed to be inventor of algebra, but this is doubtful; six books of his *Arithmetica* and work on polygonal numbers survive.

DIORITE, family of rocks resembling granite and composed of hornblende and felspar.

DIP. See GEOLOGY.

DIPHTHERIA, a contagious disease, characterized by fever and a membranous exudation on the mucous surface, usually at the back of the throat and the tonsils. An attack generally comes on gradually, with a sore throat, on examination found to be reddened and; sooner or later, with white patches, often accompanied by shivering and vomiting and swelling of the glands of the neck. Diagnosis of diphtheria chiefly depends on the bacteriological examination of a swab taken from the throat. The person is markedly depressed, and there is a danger of sudden heart failure. Recovery is usually slow.

The treatment is to give *antitoxin* as early as possible; it neutralizes the poisons produced in the disease, and causes in the individual a change for the better in a few hours. Disinfectants may also be sprayed on the throat. Since the introduction of the antitoxin treatment the mortality has fallen.

The cause of the disease is a bacillus, called the Klebs-Löffler bacillus after its two discoverers.

The disease is endemic, becoming epidemic from time to time, and it is believed to be on the increase, occurring chiefly in children, specially those under ten years of age.

DIPHTHONG (Gk. double) compound sound, composed of two vowel sounds joined to form one sound distinct from either of the two original. There are four sounds in English which are pure D's. These are $i=a+i$, as in the word aisle; $u=i+u$, as in the word duke; $oi=au+i$, as in joist; and $ou=a+u$, as in south. Many vowels in English are not D's. in sound.

DIPLOMACY. The practice and theory of international negotiation has only been recognized as a distinct art or science since the end of the 18th cent. European diplomacy has only been on its present footing since the Congress of Vienna, 1815. In the 18th cent. states were viewed pretty much as the private property of their rulers; hence there was little or nothing of that consultation of public opinion which now plays so large a part in international relations. Again, there was little desire for universal peace or real recognition of the duties of nations to one another, even as a far-off ideal. Also, communication, of course, was far slower, and diplomatic etiquette elaborate. Diplomacy, as we know it, could hardly exist in a feudal state, and much of European negotiation between states can be traced back in principle to those Ital. states which at the time of the Renaissance offered a contrast to the centralized monarchies around them. Venice, whose traditions were derived from Constantinople, developed this branch of statecraft greatly, and the political sagacity as they are valuable to reports of Venetian ambassadors to their home government are as remarkable for political sagacity as they are valuable to the student of history.

Embassies were at first only temporary; Spain was the first to appoint a permanent ambassador to England—in 1487. Machiavelli in *Il Principe* had outlined his political theories with frank unscrupulousness, and Francis I. of France set to work to apply them. So lacking seemed diplomacy in moral principle that some of the best thinkers, (*e.g.*) Grotius, thought it either useless or mischievous. There was no idea of the possibilities to which it might lead among a number of democratic states. An ambassador was obliged to keep up much ceremony; this and the elaborate etiquette which hedged him in made it more convenient for many states only to send agents. Members of a *corps diplomatique* have various privileges: *e.g.*, they are personally inviolable—even after war has been declared. The development of communications has gradually reduced the importance and independence of diplomatists.

DIPPEL, (JOHANN) ANDREAS (1866), opera impresario, and singer; *b.* Cassel, Germany. He first appeared as an operatic vocalist in Bremen in 1887 after studying music at Berlin, Milan and Vienna. Thereafter he took important tenor parts in opera in London, Breslau, Vienna and Bayreuth. He made operatic and concert tours through the United States on several occasions and from 1908 to 1910 served as joint director with Gatti-Casazza of the Metropolitan Opera House, New York City. Afterwards he founded the Chicago Grand Opera Company and directed it till 1913. His repertoire comprised a wide range of parts of the German, Italian and French schools and many oratorios.

DIPPEL, JOHANN KONRAD (1673-1734), Lutheran theologian and scientist; invented Prussian blue.

DIPPER, GREAT. See CONSTELLATIONS.

DIPPERS, WATER-OUZELS (*Cinclidoe*), a family of 26 thrush-like perching birds.

DIPSOMANIA, an insatiable craving for drink, particularly alcoholic, often occurring periodically.

DIPTERA, FLIES, insects possessing two membranous, usually transparent, wings; the major portion of the head is occupied by the large eyes, and bears the suctorial mouth parts. It is united to the thorax by a delicate neck, ensuring remarkable mobility. The larvæ are termed maggots or grubs, and are marvelously rapid in development, this only taking a few days. Owing to their scavenging habits, flies are a great source of danger to health. See FLY.

DIPTYCH, originally a tablet made to shut, containing letters, etc.; then in Christian Church names were recorded on it, and calendars and martyrologies developed.

DIR (35° 15′ N., 71° 50′ E.), independent state, N.W. Frontier Province, India; chief town, Dir.

DIRCE (classical myth.), wife of King Lycus; Antiope's sons tied her to the horns of a wild bull, which dragged her about until she perished.

DIRECT CURRENT is the name given to an electric current flowing continuously, in one direction, through a wire or other conductor. A Direct Current (of electricity) flows when the two ends of a conductor are maintained at different electric potentials. This occurs when the ends of the conductor are connected to a constant (direct) current generator, or any form of electric cell or combination of cells (battery), of either of the wet, dry or storage types. The strength or magnitude of a direct current flowing through a conductor is usually expressed in Amperes, and is proportional to the quotient of the difference of potential between the ends of the conductor divided by the electrical resistance of the conductor of electricity.

DIRECT CURRENT GENERATORS are dynamo electric machines designed to convert mechanical energy into electrical energy, which is delivered as a direct current (of electricity). This is done, utilizing the principle of electro-magnetic induction, by causing coils of copper wire, wound on a suitable drum or cylinder of iron (called an armature) to rotate in a strong magnetic field. The latter is produced by a number of large electro-magnets (called field magnets) with iron cores (poles) of suitable shapes. A current reversing device called a commutator, to which the ends of the various coils are connected, is mounted on the same shaft as the armature, and revolves with it. The function of this device is to properly connect the rotating coils to the terminals of the machine so that the current induced in these coils, which is alternating by virtue of their being rotated in the magnetic field will appear at the terminals as a uni-directional current. The Direct Current generator was first devised by Pixii, 1833. Clarke, Wheatstone, Saxton, Siemens and many other early 19th century scientists contributed to its development. At present machines of several thousand Kilo-watts capacity are in operation, some having efficiencies as high as 95%. See ELECTRICITY.

DIRECT CURRENT MOTORS are rotating machines built in a manner very similar to Direct Current Generators, but designed to convert electrical energy into mechanical energy. Like the Direct Current Generator which they so closely resemble and with which, in fact, they are interchangeable, these motors operate on the principles of electro-magnetic induction and Lenz's law. They have been developed to a high degree of perfection and are used extensively to furnish the motive power for Electric cars, Trucks and many forms of power using machines. They are particularly adapted to applications where wide variations of speed are necessary, such as printing presses, lathes and various other machine tools. The speed of these motors is varied either by varying the strength of their magnetic field or by changing the voltage applied to the armature windings. A decreased field strength or an increased armature voltage causes the motor to run faster. However when the field strength is decreased beyond a certain point the torque developed falls off rapidly, so that if further increase of speed is necessary the voltage applied to the armature must be increased. Variation of the current flowing through the field magnets, resulting in variation of field strength, is generally sufficient for all ordinary purposes. See ELECTRICITY.

DIRECTORS, persons managing a public company or trading concern for the benefit of themselves and all shareholders.

DIRECTORY (1795-99), committee of five which during Fr. Revolution formed executive government of France from end of Reign of Terror and death of Robespierre to Consulate of Napoleon. The extravagant pseudo-classical designs of ladies' dresses at that period were revived, 1910, as 'Directoire gowns.' See FRENCH REVOLUTION.

DIRIGIBLE. See AERONAUTICS.

DIRK, dagger, ornamented with cairngorms, worn with full Highland dress.

DIRSCHAU (54° 6′ N., 18° 45′ E.), town, on Vistula, W. Prussia, Germany; sugar factories. Pop. 41,190.

DISCIPLES OF CHRIST, a religious sect originating in Tennessee and Kentucky about 1800. It has its foundation or creed in a declaration made by Thomas Campbell, a seceder from the Presbyterian Church, whose son, Alexander, later led the movement. The sect aims for unity among Christians, and rejects all articles of faith except what is taught by the Word of God, especially the New Testament. Baptism and the Lord's Supper are observed. The church government has deacons, elders and bishops, and is congregational. Each of the denomination's congregations calls itself 'the Church of Christ.' The Disciples have been very successful in evangelizing work abroad and support missions in India, China, Japan, Africa, the Philippines, Cuba, Porto Rico, Mexico, Scandinavia and Turkey. A number of universities and colleges are under their control; among them Bethany College, West Va.; Spokane University, Washington; Kentucky University; Butler University, Indianapolis; Garfield University, Kansas; Drake University, Des Moines; and Eureka College, Illinois. In 1921 the church had become the fifth Protestant denomination in the United States. The total number of communicants in the world then was 1,277,231, and in the United States, 1,210,023. Its churches numbered 9,622 throughout the world, and in the United States and Canada there were 6,079 preachers, 304 of whom were colored. The Disciples of Christ are specially influential in Kentucky, Indiana and Missouri, and also have large followings in Illinois, Iowa, Kansas, Nebraska and Texas. They have an increasing number of periodicals, the chief of which are the Christian Century, Christian Standard, Christian Evangelist, and the World Call.

DISCLAIMER, legal term signifying denial or renouncement of claim or right; statement made by patentee when he has claimed more than his due, showing what idea he does not claim under his patent.

DISCO, an island on the W. coast of Greenland. It is 70 m. long and about 50 m. wide. Godhavn is a harbor in the S. of the island. There is much coal to be found.

DISCOUNT, abatement or deduction from an account rendered; usually allowed when an account is paid earlier than stipulated, or to customers buying large quantities; in railway transactions known as 'rebate.' Stocks at less than par are at a discount; most common technical use of term is connected with the sale of bills of exchange due at a future date, and sold for cash; the abatement from the face value, calculated on the time that must elapse before the bill is due, is known as discount.

DISCOVERY, a legal term denoting disclosure by a defendant in an action of certain facts, documents, or deeds, which the plaintiff obliged him on oath to discover to the court so as to make good his case. Similarly the defendant may call on the plaintiff for a 'discovery.'

DISCUS, stone or metal disk, used for throwing in ancient Gk. athletics. At the Olympic games held in Athens, 1896, d. throwing was revived as a sport.

DISEASE AND BACTERIA. See BACTERIOLOGY.

DISEASE, GERM THEORY OF, based on the modern knowledge of bacteria, and made possible only through the development of the improved microscope. In the latter part of the seventeenth cent. Antony van Leeuwenhoek, a Dutch merchant, observed through the microscope that stagnant water teemed with minute 'animalcules,' of literally countless sizes and forms; that some of these could survive desiccation and after being blown about as dust would, when again coming in contact with moisture, come to life once more. O. F Müller, a Dane, continued these observations a century later. The great successor of these two was the German, Ehrenberg, whose works were first published in 1838, and who made drawings of some 1,500 forms of these 'Infusoria,' as they were generally called. These studies were continued in modern times by Cohn, Pasteur and Koch, who indicated that many of these forms of life, more definitely called bacteria, were really minute plants, allied to the blue-tinted, thread like weeds common in fresh waters. The first discovery of a disease-producing bacterium was made as far back as in 1854, by the French pathologist, Davaine, who found that the blood of sheep, suffering from the disease known as splenic fever, or anthrax, to which men and other animals are also liable, was occupied by countless swarms of rod-like bacterial parasites, and came to the conclusion that they were the cause of the disease. Later, in 1863, Pasteur took up the investigation of this disease and so discovered that in the blood of fowl suffering from cholera other characteristic bacteria were present. From these early observations has come the modern knowledge that all infectious diseases, of men and animals, and in some cases of plants, are due to the presence in the living body of different kinds of bacteria. A few infectious diseases, such as malaria, are due to the presence of a species of parasite of an animal nature, rather than vegetable, classed as protozoa. Not all, and not even a large proportion, of bacteria are harmful. The contents of the intestines teem with them, but not only are they not harmful, but they assist the process of digestion. Even the poison-producing bacteria are normally present, but it is only when special conditions in the body encourage their multiplication by reproduction that disease ensues. In some cases, as in lockjaw, or tetanus, the disease is produced by the co-operation of two or more kinds of bacteria. Ordinarily, when the lockjaw bacterium gets into the blood through a wound, the blood corpuscles attack it and limit its numbers, but when it is accompanied by what are known as septicaemic bacteria, the latter attract the whole attention of the blood corpuscles, giving the tetanus bacteria their opportunity to progress in their deadly work. Another wound infection, 'gas-gangrene,' common during the World War, is caused by the co-operation of three or four different kinds of bacteria.

DISESTABLISHMENT, movement for the separation of Church and State; theoretically founded on the contention that a connection between the secular power and the Church, which is a religious organization whose head is Christ, is incompatible with the nature and rights of the Church. As a practical political question disestablishment is proposed, to abolish what is described as an unjust preference given to one particular religious organization in the State over others. The suggestion that the absence of a State Church tends to irreligion is rebutted by reference to those countries which have no State Church. The Church of Ireland (Episcopal) was disestablished in 1869. The Welsh Disestablishment Bill became law on Sept. 18, 1914; but a Suspensory Act, which became law on the same day, postponed disestablishment until a date fixed by Order in Council after the end of the war, March 31, 1920. In France the separation in Church and State was brought about in 1905.

DISINFECTANTS, substances which destroy bacteria and so prevent the spread of infectious disease, (*e.g.*) potassium permanganate, carbolic acid, sulphurous acid fumes, formaldehyde.

DISLOCATION, or **LUXATION** (loosening), in surgery, the displacement of one bone from another with which it is articulated (commonly called 'putting out of joint'). Usually the result of an accident, but may be caused by disease or be congenital (occurring before birth). Displacements may be partial or complete. They are classified as 'simple' when the skin is unbroken, 'compound' when there is a wound. A complicated D. is a displacement of a bone, accompanied by severe local lesion of the soft parts or fracture of the bone. The process of righting a D. is called 'reduction.' Reduction of recent luxations is comparatively easy to doctors, but in old and long-neglected cases it involves an operation which may be followed by bad consequences for the patient. Since introduction of anæsthetics treatment is much easier. Manipulation has, since 1870, largely replaced the method if traction or extension. D's. are rare on infancy or old age. They usually take four to six weeks to heal. The shoulder is the joint most frequently dislocated, or the hip in the lower extremity.

DISMAL SWAMP, a large tract of marsh land, beginning a little south of Norfolk, in Virginia, and extending into North Carolina. It has an area of 150,000 acres, and is 30 miles long and 10 miles broad. Formerly it was entirely covered with trees and with almost impenetrable underbrush. It has now been partly cleared and drained. In the center of the swamp is Drummond's Lake, 7 miles long, which was the scene of Thomas Moore's poem, *Lake of the Dismal Swamp*. Dismal Swamp canal connecting Chesapeake Bay with Albemarle Sound, which was a historic waterway up to the close of the Civil War, was reopened in 1899. It forms an important link in the chain of inland waterways extending from New York to Florida. Although the canal is only 22 miles long it opens up 2,500 miles of inland navigation.

DISPENSATION, remission of a law, generally used in relation to an act of the Pope such as that of granting Henry VIII. permission to marry Catherine of Aragon, his late bro.'s wife.

DISPERSION (*m optics*), a term used to denote the effect produced when a beam of white light is passed through a glass prism. The resulting beam is spread out into a broad band composed of the seven primary colors. The original light is 'dispersed' owing to the different amounts by which rays of different colors are bent, when passed through a prism. On passing the light through substances which absorb certain colors, the d. produced is abnormal. This phenomenon, termed *anomalous d.*, is the cause of the use of ruled gratings instead of glass prisms, in the study of spectra. D. is also used to signify the scattering of light at a reflecting surface.

DISRAELI, BENJAMIN, see BEACONSFIELD.

DISRAELI, ISAAC (1766-1848), Eng. author; belonged to a family of Span. Jews; *f.* of Earl of Beaconsfield; author of *Curiosities of Literature, Calamities of Authors*, etc.

DISS (52° 23′ N., 1° 7′ E.), market town, on Waveney, Norfolk, England. Pop. 1911, 3,769.

DISSENTERS, 'Nonconformists,' those who dissent from the teaching of the Church of England; call themselves 'Free Churchmen.'

DISSOCIATION (Electrolytic). A hypothesis first formulated by the Swedish chemist Arrhenius, and now generally accepted as one of the basic theories of physical chemistry. It states that when acids, bases, and salts are dissolved in water, they split up or 'dissociate' into ions. For instance, when hydrochloric acid gas is dissolved in water, it is supposed to dissociate into hydrogen ions bearing a positive charge and chlorine ions bearing a negative charge. The acid is then said to be 'ionized.' The degree to which substances ionize when dissolved in water varies considerably. For instance, a decinormal solution of acetic acid is ionized to the extent of about 1.3 per cent., while a solution of hydrochloric acid of equal strength is about 95 per cent. ionized. The chemical behavior of a substance depends to a very large degree on the extent to which it dissociates in solution, and during recent years methods have been evolved for determining the concentration of hydrogen ions in a solution. Such determinations frequently have far greater significance than the mere capacity of the solution for neutralizing an alkali. See CHEMISTRY.

DISTAFF, a stick or staff, to which material for spinning, as cotton, flax, etc., was fixed, in the method of spinning by hand. The D. was held under the left arm, and the fibres, as they were drawn from it, were spirally twisted with the right hand. During the process of spinning, the thread was wound round a revolving reel.

DISTEMPER, method of painting equivalent to 'tempera,' which signifies some substance mixed with coloring matters to give them proper consistency, drying qualities and adhesiveness. In the 'fresco' process no tempera is employed, but in every other kind there is always a mixture of some substance such as wax, drying oils, varnishes, and resins, yolk of egg, size, gum, honey, and the like. In tempera the solvent is water; where pigments are toned by the use of whiting and tempered with size, the process is called 'distemper' used by scene and house painters.

DISTILLATION, the conversion of substances into vapors, afterwards condensed into liquid form, is employed to separate and purify liquids, especially organic liquids. Heat converts liquids into vapor; cold converts vapors into liquid. These two processes constitute d. Solid particles, being inconvertible into vapor, are left behind. Liquids have distinct boiling-points at which they pass into vapor, so liquid impurities of lower boiling point can be condensed and collected first, while those of higher boiling-point than the required liquid are left behind. The necessary apparatus consists of a distilling flask and a condenser. The d. *flask* has a long neck and a long, narrow side-tube. In the neck is a cork fitted with a thermometer, the bulb of which comes just below the side-tube and records the temperature of the vapor. The *condenser* is a glass tube with a glass or metal jacket with entrance and exit tubes through which cold water runs continuously. A cork bearing the side-tube from the d. flask fits into one end, while the other end dips into a collecting flask. The d. flask is heated, and when the thermometer records that the vapor is passing through the side-tube into the condenser at the boiling-point of the required liquid, a fresh collecting flask is connected.

DISTILLATION OF COAL. When coal is heated to a high temperature in retorts, out of contact with air, a number of volatile products are distilled off, a residue of coke being left in the retorts. The principal volatile products are illuminating gas, coal tar and ammoniacal liquor. The tar and the liquor, which leave the retorts in the form of vapor, are condensed by cooling, and are thus separated from the gas, which consists of a mixture of *illuminants*, *diluents*, and *impurities*. The illuminants consist of ethylene, propylene, butylene, acetylene, allylene and benzine. The diluents are hydrogen methane and carbon monoxide, and the chief impurities nitrogen, carbon dioxide and sulphuretted hydrogen. See COAL TAR PRODUCTS.

DISTRESS, in law, the act of distraining (seizing) goods by a landlord under a d. warrant for the recovery of rent.

DISTRICT COURTS, the primary tribunals of the federal judicial system of the United States. Each has a judge, clerk, marshal and district attorney. The courts represent a judicial district, which may embrace the whole of a state or territory, or only a portion of a state. The largest states have several districts. The courts exercise jurisdiction over litigation and offenses arising under the federal constitution and statutes and under treaties, inclusive of suits brought by the United States. They pass on matters of issue between citizens of different states, or between citizens of foreign states. Their jurisdiction embraces maritime, inland revenue, and customs cases; question of patents, copyrights and tradesmarks, prosecutions of trusts and monopolies; and cases relating to interstate commerce, immigration and bankruptcy. The rulings of the District Courts are subject to appeal before the Circuit Courts of Appeal and the Supreme Court. As now constituted, the District Courts date from 1911, when they were empowered to exercise the original jurisdiction formerly possessed by the Circuit Courts. A District Judge receives $6,000 a year.

DISTRICT OF COLUMBIA. The national capitol and adjoining territory. The question of selecting district and site for a national capitol had been discussed early in the history of the republic and it was the first congress under the constitution that proposed a site on the Susquehanna River. The location was afterwards changed to the Potomac, and by an act passed by Congress June 21, 1790, the seat of government was to be located 'between the Eastern Branch and the Connogocheague.' The First Congress met in the new location in 1800. Originally the territory was ten miles square, Maryland ceding Washington County in 1788 and Virginia Alexandria County in 1789. Washington having disposed of his land holdings there, personally laid out the district under the Act passed March 1791. The land selected on the Maryland side contained Powhatan's village of Anacostan and the present Georgetown which was founded in 1757. On the Virginia side was Alexandria, formerly Belhaven. Until September 9, 1791, the site was called 'The Federal City' when the president appointed three commissioners who named the district 'Territory of Columbia.' In 1846 Alexandria County was ceded back to Virginia on petition of the inhabitants. In 1871 owing to the action of business men, the district was made a territory with governor, legislature, and delegates in Congress. The government was soon controlled by unprincipled men, and bankruptcy followed. In 1874, the territorial government was abolished and Congress governed again under three commissioners appointed by the president. This was a temporary arrangement until the citizens and Congress prepared the permanent Act of June 1878, called 'Constitution of the District of Columbia.' Half the expenses of the district are paid by the government. There is no popular suffrage. The government is in the hands of commissioners appointed by Congress, which recommends appropriations, etc. Pop. 1920, 437,571. See WASHINGTON, D.C.

DISTRICTS, CONGRESSIONAL. See APPORTIONMENT.

DITHYRAMBIC POETRY, irregular form of Gk. lyric poetry, originally used in worship of Dionysus (Bacchus). A modern example is Dryden's *Alexander's Feast*.

DITMARS, RAYMOND LEE (1870), naturalist, *b.* Newark, N.J. After graduating from the Barnard Military Academy in 1891 he became assistant curator of entomology at the American Museum of Natural History, New York City, and eight years later joined the New York Zoological Park staff, first as curator of reptiles and then as director of the department of mammals. His writings include authentic observations on reptiles, entomology and herpetology.

DITTERSBACH (50° 45′ N., 16° 22′ E.), town, Prussian province of Silesia, Germany; coal mines. Pop. 11,463.

DITTERSDORF, KARL DITTERS VON (1739-99), Austrian composer and violinist; *b.* Vienna; ed. at Prince Joseph von Hildburghausen's expense; cr. '*von* D.,' 1773; best works: *Esther Isaac, Job* (oratorios), *Doktor und Apotheker, Betrug durch Aberglauben* (comic operas), besides orchestral and chamber music.

DIURETICS, substances which cause increase in the flow of urine, by acting on the kidneys, the blood, or blood-vessels, or the nervous system; *e.g.* caffeine, digitalis.

DIVAN, DIWAN, Persian word meaning Oriental council; chamber where such meetings are held; collected works of Arabic poet.

DIVANIEH (32° N., 45° W.), small town, on Euphrates, Asiatic Turkey.

DIVERS (*Colymbidoe*), a family containing 5 species of handsome, long-necked swimming birds, found in the northern parts of the Old and New Worlds. They obtain their food by diving, and have colored bars on the throat. Three species occur in Britain.

DIVERS AND DIVING. The employment of naked divers for searching the sea-bottom for pearls, sponges, etc., apparently dates back to very early times, and this primitive method is still used to some extent in the East. Divers are referred to in Homer's *Iliad*; they were employed by Alexander the Great; and numerous references to them are found in the classic writers. The *diving-bell*, the earliest means of assisting the diver, is stated to have been the invention of Roger Bacon, 1250. This must have been a very rude contrivance, of which no description is extant. The modern diving-bell dates from 1788 (when it was used by Smeaton at Ramsgate, England,) and consists of a cast-iron chamber, weighing about 5 tons, supplied with air by means of a force-pump. The modern *diving-dress* consists of a suit of sheet india-rubber, covered with twill, with close-fitting vulcanized cuffs and collar; weighted boots, averaging 20 lb. each; weights on back and chest of 40 lb. each; metal helmet and breast-plate, 40 lb.; and strong sheathed knife at belt. The helmet is provided with glass lights at the front and sides, and air is supplied by means of a rubber tube attached to the back of the helmet. A 'life-line,' or signalling line, of Manila rope is attached to the diver's waist. A naked diver cannot remain below water longer than three minutes at the outside; a diver in patent dress can remain under water from two to four hours. All modern warships carry one or more trained divers as part of the crew.

DIVES-SUR-MER (49° 18′ N., 0° 7′ W.), watering-place, at mouth of Dives, Calvados, France; here William the Conqueror embarked for England, 1066. Pop. 3,500.

DIVIDEND, income derived from profit of capital invested in stock or company; 'preference' d. paid before ordinary d.; term also used of money divided between creditors, etc.

DIVINATION, the process of seeking knowledge of unknown or future things by means of astrology, trance, crystal-gazing, and various other methods. The professed art dates back to early times, and is more or less common to civilized and uncivilized peoples, and, mixed with much charlatanism, still finds many believers.

DIVING BELL. See DIVERS AND DIVING.

DIVINE RIGHT, the principal insisted upon by James I. of England and carried to extremes by the supporters of his son. The Stuarts set forth that they were the direct representatives of the Deity, and as such were to receive the obedience due to God's viceroy on earth. They themselves owed obedience to Him alone, and were relieved from all responsibilities towards their subjects. Charles I.'s claim to this D.R. was the direct cause of the royalist and parliamentary struggles of the 17th century. The idea did not really lose its hold until after the suppression of the rebellion of 1745 in England, and till the great Revolution in France.

DIVINING ROD, forked branch, usually of hazel, which is carried by the diviner, and is said to dip where water, or some mineral, is concealed in the earth. Some of the phenomena are too well authenticated to be wholly ascribed to charlatanism, and are referred to animal magnetism.

Beaven, *Tales of the Divining Rod* (1899.)

DIVISION, process by which a term taken as *genus* is split up into its *species*; must be exhaustive, step by step, and avoid cross-division.

DIVORCE, a legal decree dissolving a marriage, either through the agency of a court of justice, a legislature or an ecclesiastic tribunal. In the United States the power to dissolve marriages originally reposed in the legislatives of the colonial provinces or states, but such jurisdiction proved defective, and except in South Carolina (where the legislature still has this authority, but does not recognize absolute divorce for any cause) the granting of divorces has long since been transferred to State courts. The States make their own laws governing the grounds for divorce, and their diversity is so wide and confusing that they frequently come in conflict in suits where the parties have been married in one State and seek a dissolution in another. Many cases occur in which a couple, married in one State before the divorce decree allows it, are branded bigamists in another State. The forty-eight States at present have more than forty different codes of law on the subject of marriage and divorce. For many years these conditions and the laxity of some State laws have produced an active movement for a fundamental reform in divorce legislation, either by the States deciding among themselves to establish uniform statutes, or by removing the power of divorce to the federal courts under a uniform federal law.

Recent available figures down to 1916 show divorce increasing in the United States, as it is in other countries. In that year the reported number of American divorces was 112,036, but this figure is under the mark, as 95 counties did not furnish statistics. Of the 112,036 divorces, 33,809 were granted to husbands, or 31.1 per cent., and 74,893 to wives, or 68.9 per cent. The total figure for 1916 compared with 72,062 in 1906 and 42,927 in 1896. The states which granted most divorces in 1916 were Illinois, 8546; Texas, 8504; Ohio, 7607; Missouri, 5791; Indiana, 5636; California, 5573; and Michigan, 5317. Since 1916 the number of American divorces were estimated at 120,000 in 1917, 125,000 in 1918, 129,000 in 1919 and 132,000 in 1920.

The laws of western States enumerate more grounds for divorce than do those of the eastern States, which explains the greater frequency of divorce in the first named sections. New York, for example, only permits divorce on the single ground of adultery, while such causes as religious belief, aversion of couples for one or the other, bad temper (incompatibility of temperament), or failure to live together in harmony alone constitute sufficient grounds for breaking the wedding bond in some of the newer States. Cruelty, conviction of felony and habitual intoxication are sufficient grounds for divorce in most of the States, but there are a number of important exceptions. Alabama, Arkansas, District of Columbia, Maryland, New York, North Carolina, Tennessee, Vermont, Virginia, West Virginia and Washington do not accept cruelty as a sole cause. There must be more than a conviction of felony to obtain a divorce in Connecticut, Florida, Maine, Maryland, Mississippi, New Jersey, New York, North Carolina, Rhode Island, South Dakota and Tennessee; failure to provide means of subsistence serves as a sole cause of divorce. Adultery and bigamy, of course, are a fundamental grounds for divorce in all the States.

The chief causes for divorce in the United States are desertion and cruelty, which account for almost two-thirds of the decrees granted. Adultery furnishes about one-fifth of the causes of action. Drunkenness has become a minor element in divorce suits. More than one half of divorce couples were childless.

Divorce proceedings may come before a judge, or before a referee appointed by the court to take testimony, or they may be determined by a jury. In some States either party to a divorce suit may demand a jury trial. The failure of a defendant to appear to contest a suit is not accepted by the court as an admission of the offense and a plaintiff does not therefore win a verdict by default, as happens in other actions. A plaintiff must prove his or her case. The discovery of collusion, or a conspiracy between the parties to effect a divorce, will bar a dissolution. A case will also fail if condonation of a conjugal offense is proved, but the right of action becomes restored if the offense is repeated.

English law grants a divorce on the ground of adultery alone to a husband, but an injured wife must also prove cruelty or desertion. Strong efforts have been made since the World War to change the law so as to permit a woman to obtain a divorce on misconduct alone, as a man can, and legislation providing for this reform passed the House of Lords in 1921. An English divorce decree is not operative for six months after it is pronounced. The law does not safeguard the conditions preliminary to marriage in order to lessen the chances of subsequent divorce. Bigamous or clandestine marriages are restricted in France by the legal obligation of youthful couples to have the consent of their parents or other relatives to their union. Germany and other countries have similar provisions. In France the parties must also produce certificates of birth and any previous marriage must be proved to have been annulled by death or divorce. By these safeguards bigamy is greatly checked in France. Divorces in that country did not exist from 1816 to 1884. The law now permits a dissolution of marriage on the ground of adultery, ill treatment (which includes opprobrious epithets), conviction of crime, and mutual incompatibility. Belgium follows France in her divorce laws. One feature of the divorce laws of France, Germany, Belgium, Holland, Portugal and Spain does not prevail in the United States or England. It is that where one party is divorced by reason of adultery, the spouse found guilty cannot intermarry with his or her paramour.

DIWAN, term used in India for native head official of a state.

DIWANIEH (31° 59′ N., 44° 58′ E.), town, built on either bank of Euphrates, Turkey in Asia; seat of government of Affech district transferred from Hillah to D., 1893; of strategic importance.

DIX, DOROTHEA LINDE (1802-1887), philanthropist, *b.* Hampton, Me. As a young woman she inherited property and thereafter devoted her life to social service in reclaiming and alleviating the condition of the unfortunate, especially lunatics, paupers and criminals. She visited and investigated prisons, asylums and almshouses in every part of the country. More than thirty new institutions for the insane were established through her efforts. During the Civil War she was chief of the hospital nurses of the Union forces. She traveled in Europe, inquiring into the lot of the mentally defective there, and succeeded in promoting remedial action for the betterment. Congress appropriated $10,000 for erecting a memorial to her at her birthplace. She wrote on prisons and prison discipline and a number of books for children.

DIX, JOHN ADAMS (1798-1879), statesman and soldier, *b.* Boscawen, N.H. As a boy of fourteen he joined the United States army on the outbreak of the War of 1812, saw service on the Canadian frontier, and continued in the army till 1828, then retiring as captain. He opened a law practice at Cooperstown, N.Y., having qualified for the bar while in the army, and later held several State offices, notably adjutant-general and Secretary of State. He became a member of the New York State legislature in 1842 and from 1845 to 1849 served as United States Senator. President Buchanan appointed him his Secretary of the Treasury in 1861, after he had filled the offices of assistant treasurer and city postmaster in New York City. Thereafter he became nationally prominent, owing to the part he took in the Civil War. Just before its outbreak, the captain of a revenue cutter refused to come from New Orleans to New York at Dix's orders, whereupon Dix ordered his arrest, accompanying his instructions with the famous declaration: 'If any one attempts to haul down the American flag, shoot him on the spot.' He headed the Union Defense Committee, organized seventeen regiments, was commissioned a major general of volunteers, and commanded the Department of the East at New York from 1863 to 1865. The next year he went to France as United States minister, serving until 1869. In 1872 he was elected governor of New York.

DIX, JOHN ALDEN (1860), manufacturer, *b.* Glens Falls, N.Y. After graduating from Cornell in 1883 he became identified with the quarrying of black marble, and with lumber, wood-pulp, and papermaking, and also served on a number of banking and corporation directorates. He was governor of New York from 1910 to 1912.

DIX, MORGAN (1827-1908), Episcopal clergyman, *b.* New York City, the son of John Adams Dix. On graduating from the General Theological Seminary in 1852 he took Episcopalian orders and in 1855 began a connection with Trinity Church, New York City, that lasted fifty-three years. He first served as assistant minister, was appointed assistant rector in 1859 and rector in 1862, holding the rectorship for forty-six years, or till his death. He published the memoirs of his father, as well as commentaries and expositions on the epistles to the Romans, Galatians and Colossians.

DIXEY, HENRY EDWARD (1859), actor, *b.* Boston, Mass. He began his theatrical career in 1868, playing in stock companies, and enacted many roles in many places, including Sir Joseph Porter in *Pinafore* and the Lord Chancellor in *Iolanthe*. In 1884 he achieved a great success in the star part of *Adonis* at the Bijou Theatre, New York City, and repeated his success in London. His later parts included David Garrick in Robson's *Oliver Goldsmith*.

DIXMUDE, small tn., W. Flanders (51° 2′ N., 2° 52′ E.), on the Yser, 15 m. from sea; formerly a seaport; great parish church of St. Nicolas, *c.* 1600; now one of the 'dead cities'; dairy-farming center; as a bridgehead on the Yser was heroically defended by Belgians and Fr. marines from Oct. 16 to Nov. 11, 1914; only captured when reduced to ruins and church destroyed; gallant defense gained its object—the country was flooded, and the Germans were unable to advance from the narrow bridgehead. Pop. before the war, 4,200.

DIXON, a city of Illinois, in Lee co., of which it is the county seat. It is on the Chicago & Northwestern, and the Illinois Central railroads, and on the Rock River. It has important industries, including the manufacture of condensed milk, shoes, ploughs, furniture, Portland cement, etc. Here are the Northern Illinois Normal School and the Rock River Military Academy. Pop. 1920, 8,191.

DIXON, GEORGE (*d.* 1800), Eng. navigator; pub. *A Voyage round the World*, 1799.

DIXON, THOMAS (1864), an Amer. novelist and playwright, *b.* at Shelby, N.C., son of Rev. Thomas and Amanda Elizabeth McAfee Dixon. After graduating from Wake Forest College, N.C. in 1883 he studied law at Greensboro, N.C. Law School and was admitted to the bar in all courts of N.C. and United States District and Supreme Courts in 1886. He became a member of the North Carolina Legislature in 1885 but resigned to enter the Baptist ministry the following year, and was afterwards pastor at Raleigh, N.C., Boston, and later New York where he was also a popular lyceum lecturer. Among his works are: *The Leopard's Spots*, 1902; *The Clansman*, 1905; *The Sins of the Father*, 1912; *The Southerner*, 1913; *The Birth of a Nation* (photoplay), 1915, and *The Man in Gray*, 1921.

DIXON, WILLIAM HEPWORTH (1821-79), Eng. author and traveler; editor of *Athenoeum*, 1853-69.

DIZFUL, DIZ-PUL (32° 30′ N., 48° 35′ E.), town, on Diz, Khuzistan, Persia; active trade; near ruins of Susa. Pop. 25,000.

DJAKOVO, DJAKOVAR (45° 17′ N., 18° 20′ E.), town, Croatia-Slavonia, Hungary. Pop. 21,000.

DJEMAL PASHA, Turk. general, commanded a division in the Balkan War, and after the capture of Adrianople became minister of marine, 1914; took command of the 'army of Egypt' when Turkey entered the war; repulsed in an attempt to cross the Suez Canal; after failure of the attack remained nominal commander-in-chief, but was succeeded in 1915 by the German Liman von Sanders; after the Armistice became minister of war, and secretly removed troops and munitions to Anatolia in spite of Armistice terms; a strongly worded remonstrance by the Allied powers led to his resignation, Jan. 22, 1920. He was assassinated by two Armenian youths in Tiflis, July 25, 1922.

DLUGOSZ, JAN (1415-80), Polish statesman; in service of Cardinal Olesnicki, then of King Casimir IV., abp. of Lemberg, 1478; wrote *Historica Polonica*, first great work on Polish history.

DMITRIEFF, RADKO (1859), Bulgar general; commanded one of the Bulgarian armies in the Balkan War; won decisive battle of Lule Burgas; popular hero, but weary of the quarrels which broke out amongst the allies, joined the Russian service with rank of general; became corps commander under Brussilov, and distinguished himself at the storming of Gnila Lipa line before the capture of Lemberg, Sept. 1914; subsequently commander of 3rd Russian Army on W. Galician front; extricated his army after the great Ger. attack on the Donajetz, though at a heavy cost; handed over his command in June 1915; when Bulgaria joined the Central Powers returned his Bulgarian decorations, and was declared a deserter. Later commanded the 12th Russian Army on Rumanian front; resigned Aug. 1917.

DMITRIEV, IVAN IVANOVICH (1760-1837), Russ. poet and statesman.

DNIEPER (46° 40′ N., 33° E.), river, Russia; ancient *Borysthenes*; rises in N. of Smolensk province, flows generally southward into Black Sea; principal affluents, Desna, Soj, from E.; Pripet, Beresina, from W.; length, *c.* 1,300 miles. D. is navigable in sections; cataracts interrupt traffic, but engineering works have overcome these to large extent.

DNIESTER, or DNIESTR, river, S.W. Russia, rises on N.E. slope of Carpathians (49° 12′ N., 22° 57′ E.), and after course of 350 m. reaches the old Russian frontier W. of Khotin. From this point it demarcates Bessarabia from Galicia, Podolia, and Kherson, passing Moghilev and Bendery, or Bendar; ends in a *liman* (46° 25′ N., 30° 15′ E.), on which stands Akerman. Total length, over 850 m.; drainage area, *c.* 30,000 sq. m. Traffic mainly in cereals and timber; most considerable trib. the Sereth, which flows S. past Tarnopol and enters main stream some 20 m. W. of the Russian frontier. From E. to W. other N. bank tributaries are the Strypa, Zlota Lipa, and Gnila Lipa, which flow roughly parallel through forest-clad cañons. In Galicia, the Dniester also turns through a narrow chasm in the forest belt, forming large and intricate loops; a serious obstacle to military operations; region scene of much fighting in the course of the Russian campaign during the World War.

DOAB, DUAB, Ind. name for a tract of country between two rivers; particularly land between Ganges and Jumna.

DOANE, GEORGE WASHINGTON (1799-1859), Amer. Episcopalian ecclesiastic; bp. of New Jersey, 1832; prominent in educational work.

DOANE, WILLIAM CROSWELL (1832 - 1913), Episcopal prelate, *b.* Boston, Mass., the son of George Washington Doane, also a bishop of the Protestant Episcopal Church. After his graduation from Burlington College, N.J., where his father lived as bishop of that state, he was ordained priest in 1856 and served as minister in two Burlington churches. In 1859 he became rector of St. Mary's, Burlington, in succession to his father, who held both the rectorship and bishopric till his death in that year. From 1861 to 1869 he held rectorships at Hartford, Conn. and Albany, N.Y. In the latter year he became the first bishop of Albany and was head of the diocese for forty-four years. He took an active part in several Lambeth Conferences. In Albany he founded St. Agnes School and successfully applied his energies to the building of a cathedral there. His chief literary work is a life of his father.

DOBELL, SIR CHARLES MACPHERSON (1869); Brit. soldier, entered army, Royal Welsh Fusiliers, 1890; served in Hazara expedition, 1891; Crete, 1897-8; S. Africa, 1899-1900; China, 1900; N. Nigeria, 1906; during World War commanded Allied forces in Kamerun, 1914-16, and the 'East Force' in the two unsuccessful battles for Gaza, March and April 1917, in the Palestine campaign; subsequently appointed inspector-general W. African Field Force.

DOBELL, SYDNEY (1824-74), Eng. poet; belonged to the 'Spasmodic school'; his works include *The Roman*, *Balder*, and *England in Time of War*.

DÖBELN (51° 7′ N., 13° 7′ E.), town, Saxony, Germany; on island formed by Mulde; iron foundries. Pop. 1910, 19,627.

DOBRITCH (43° 22′ N., 27° 47′ E.), town, Bulgaria. Pop. 18,000.

DOBRUDJA (Rumanian *Dobrogea*), region between Lower Danube and Black Sea (43° 13′ - 45° 28′ N., 27° 16′ - 29° 46′ E.); mostly marshes and steppes; area, 6,000 sq. m.; chief port, Constanza, connected by railway with Bukharest across famous Cernavoda bridge; assigned to Rumania by Russia, 1878; region of Silistria was added by Peace of Bukharest, 1913, as price of Rumania's neutrality in the wars of the Balkan League. After Rumania's entry into the World War, Aug. 1916, a mixed Bulgarian, Turk., and Ger. army under von Mackensen overran the Dobrudja; Constanza was occupied on Oct. 22; and after the fall of Bukharest, Dec. 6, the Germans occupied the territory as far as the mouths of the Danube. By Treaty of Bukharest, March, 1918, Rumania temporarily lost the Dobrudja, which was restored after the final defeat of the Central Powers.

DOBSINA (48° 50′ N., 20° 24′ E.), small town, Hungary; iron mines. Pop. 5,115.

DOBSON, HENRY AUSTIN (1840-1921), Eng. poet and essayist; first won literary reputation in the 'seventies by poems contributed to Anthony Trollope's magazine, *St. Paul's*, and then with accomplished and charming essays, and in the old Fr. form of verse, the villanelle, rondeau, ballade, and rondel. His poetry is marked by daintiness of form and expression; pub. *Collected Poems*, *Fielding*, *Horace Walpole*, *At Prior Park and Other Papers*, etc.; ed. *Evelyn's Diary*, and annotated *Diary of Fanny Burney*.

DOCETÆ, sect of early Church, who denied the real humanity of Christ; some said what appeared as His body was a mere phantom.

DOCKET, summary of a document; a label; an endorsement on back of papers.

DOCKS, term commonly used as synonymous with wharves or piers for the loading or discharging of vessels' cargoes or passengers, and in a more restricted sense applied to floating or stationary constructions for the building or repair of ships.

Modern and thoroughly equipped docks in the first sense are recognized as vital to the development of a seaport's commerce. The larger initial cost is rapidly made up by the economy made possible by the increased facilities and the profit derived from the growing volume of traffic. Many cities with inferior natural advantages have outstripped those with better harbors by the more perfect development of their docking facilities. Cases in point are afforded by Hamburg, Germany, Antwerp, Belgium and Rotterdam, Holland, where naturally poor harbors have been made great commercial centers by elaborate systems of docks. In England, Liverpool, Manchester and Newcastle have thus made a greater comparative advance than London. In our own country, Buffalo, which had practically no natural harbor, has overcome this handicap by its harbor and dock development and become in point of tonnage the tenth port in the world. Boston, on the other hand, with a splendid natural harbor has relied on this to her detriment, and is shut off from handling a large volume of commerce that would otherwise be hers. New York, where only a few piers are laid with tracks and which has few loading or unloading cranes, is vastly inferior in this respect to Hamburg, which has 130,000 lineal feet of quays for ocean liners, more than 5,000,000 square feet of sheds and 805 cranes for loading and unloading.

American ports have wakened at last to the necessity for better docking facilities, and great projects are now under way looking toward improvement. New York City is preparing to spend many millions through its Port Commission. Baltimore has made marked strides in increasing its port facilities. There is great activity on the Pacific Coast at San Francisco, Los Angeles and San Diego, where interest had been stimulated due to the growth of trade following the opening of the Panama Canal.

There are two types of drydocks—floating and stationary. The former is designed to be towed from place to place, while the latter is excavated into the shore and heavily walled about by brick or concrete. Some of the greatest drydocks in America are those belonging to private companies such as the Cramp Yards at Philadelphia and the immense plant of the New York Shipbuilding Corporation at Camden, N.J., both of which afford facilities for the construction and repair of the largest vessels in existence or contemplated. Among the largest Government drydocks are those at the Brooklyn, N.Y., Navy Yard, the League Island Navy Yard at Philadelphia, the Puget Sound Naval Station, Port Orchard, Washington, and the Mare Island Navy Yard, California.

DOCTOR (Lat. for a teacher), one who is skilled or learned in any branch of knowledge, or whose attainments entitle him to express an authoritative opinion. As a title or degree it is granted by universities to those who have attained the highest qualification, and ranks above master; but the ranks vary, thus in divinity, law, music etc., there are no masters, and the lower degree is bachelor; in other faculties such as arts, there are no D's. In the 14th century the degree of D. was conferred in medicine, and in common parlance a 'D.' means a physician, or, quite generally, a qualified medical practitioner, whether he has taken the degree of D. in Medicine, M.D., or not. The first university degree of D. was granted at Bologna in the faculty of law, in the 12th century. The faculties in which the degree is granted are too numerous to specify, and new faculties with the growth of specialization tend to spring up. The universities are accustomed to great honorary doctorates to members of other universities, or of none, who have distinguished themselves in a particular branch of knowledge, or who are prominent generally, such as distinguished statesmen, military and naval officers, scientists, artists, writers, etc. Of these honorary degrees those of D.C.L., Doctor of Civil Law, and LL.D., Doctor of Laws, are perhaps of the highest distinction.

DOCTRINAIRES, moderate royalists who supported restored monarchy in France, 1815-30; generally, theorists maintaining abstract doctrines, regardless of practical considerations.

DODD, LEE WILSON (1879), an American author and playwright, *b.* at Franklin, Pa., son of Samuel Calvin Tate and Melvina Eliza Smith Dodd. He was educated at Yale University and at New York Law School. He was admitted to the bar in 1902 but gave up the practice of law in 1907 for literature, and in addition to contributing poems, essays and stories to various magazines and reviews he was the author of *The Return of Eve* (play), 1909; *Speed* (play), 1911; *The Middle Miles* (poems), 1915; *His Majesty Bunker Bean* (dramatization), 1915; *Pals First* (dramatization), and *The Book of Susan* (novel), 1920, and *Lilia Chenoworth* (novel) 1922.

DODD, WILLIAM (1729-77), Eng. clergyman, wrote several works; royal chaplain, 1763; executed for forgery.

DODDER (*Cuscuta*), genus of parasitic plants, order Convolvulaceæ; leafless twining stem; small flowers grow in clusters.

DODDRIDGE, PHILIP (1702-51), Eng. Nonconformist minister; pastor at Northampton, 1729; wrote *On the Rise and Progress of Religion in the Soul.*

DODGE, GRENVILLE MELLEN (1831-1916), army general and civil engineer, *b.* Danvers, Mass. Graduating from Norwich University, Vermont, as a civil engineer, in 1850, he surveyed the Platte river region for the government with the view of finding a Pacific railroad route. The Civil War found him among the Union forces. He was with Sherman in the Atlanta campaign as commander of the 16th Army Corps and at the war's close he was a major general of volunteers. As a civil engineer in the reconstruction period he directed the building of the Union Pacific Railroad from 1866 to 1870, and later built the Texas and Pacific Railroad, whose chief engineer he was for ten years. Railway construction work in Europe, Canada and Mexico also engaged his attention. He was a member of Congress from Iowa between 1867 and 1869. After the war with Spain in 1898 he headed a commission which investigated the conduct of that conflict following charges of mismanagement.

DODGE, H(ENRY) PERCIVAL (1870), an American diplomat, *b.* at Boston, *s.* of Henry Cleaves and Alice Almia Lamb Dodge. He was educated at Harvard and after studying law there was admitted to the bar in 1895 and later studied in France, Germany and Italy. He entered the United States diplomatic service in 1899 and afterwards was secretary to the American Embassy at Berlin and later Tokyo, was E.E. and M.P. to Honduras, Salvador, Morocco and Panama: was appointed rep. of State Dept. on American Commission for repatriation of Americans in Europe in 1914 and in 1919 was appointed American Minister to the Kingdom of the Serbs, Croats and Slovenes.

DODGE, MARY ABIGAIL (1833-1896), author, *b.* Hamilton, Mass. In her early career she was a teacher in Hartford, Conn., and Washington, D.C. She began to contribute to periodicals and wrote a number of books under the pen name of Gail Hamilton. Much of her writings appealed to children, and for two years, 1865-7, she was a member of the staff of Our Young Folks. She opposed woman suffrage and was an advocate of civil service reform. Her work included a life of James G. Blaine.

DODGE, MARY ELIZABETH MAPES (1831-1905), author and editor; *b.* New York City; *d.* Tannersville, N.Y. She was the daughter of Professor James J. Mapes and married William Dodge, a New York lawyer. Early widowed, she took up literary work and contributed to magazines. In 1864 appeared her *Irvington Stories,* with their appeal to children, followed by another successful juvenile work, *Hans Brinker,* or *The Silver Skates.* In 1873 she became the first editor of St. Nicholas, a magazine for the young, and retained the post till her death.

DODGE, THEODORE AYRAULT (1842-1909), military historian and soldier, *b.* Pittsfield, Mass. He was educated at the University of London, England, and also studied the military science of the Prussian army in Berlin. When the Civil War broke out he enlisted as a private and lost his right leg at Gettysburg. He became a major of the Veteran Reserve Corps, and in 1867 was brevetted a lieutenant colonel of the regular army. Between 1864 and 1870 he served as chief of the bureau of enrollment in the War Department. As a military chronicler and critic he wrote *Bird's Eye View of Our Civil War,* and *History of the Art of War,* among other works, which earned him a high standing as an authority in the science of warfare.

DODGE, WILLIAM EARL (1804-1883), merchant and philanthropist, *b.* Hartford, Conn. He received a common school education and as a boy worked in his father's cotton mill at Norwich. Father and son came to New York City in 1817 and he became an office boy in a wholesale dry-goods store. Eight years later he went into business for himself, married the daughter of Anson G. Phelps, and with the latter formed the firm of Phelps, Dodge & Co., which dealt largely in metals. He acquired great railroad, insurance and lumber interests as well as mining properties. He was always interested in temperance and religious work, generously supported the Y.M.C.A. and willed substantial bequests to charitable institutions.

DODGE CITY, a city of Kansas, in Ford co., of which it is the county seat. It is on the Atchison, Topeka and Santa Fe, the Chicago, Rock Island and Pacific railroads, and the Arkansas

River. It is surrounded by a large wheat growing and stock raising region. In the early days of cattle raising Dodge City was the chief shipping point for cattle. The division offices and machine shops of the Sante Fe Railroad are here. It is the seat of St. Mary's of the Plains Academy. There is a public library and the United States Land Office. Pop. 1920, 5,061.

DODGSON, CHARLES LUTWIDGE, (LEWIS CARROLL) (1832-98), Eng. humorist and mathematician; writer of *Alice's Adventures in Wonderland*, *Through the Looking-Glass*, etc.

DODO (*Didus ineptus*) was a flightless and extremely ungainly bird rather larger than turkey; now extinct; plumage of a dark ash color, except breast and tail, which were white, and small aborted wings, possessing yellowish white feathers with black-tipped coverts; beak large, stout, and black, tipped with pronounced horny hook; legs feathered above, yellow; heavy and short, adding to stupid appearance. As in existing flightless birds, breast-bone showed aborted keel; and coracoid and shoulder-blade met at an obtuse angle (*cf.* ostrich). D. was first mentioned by Dutch, XVI. cent.; in existence till latter half of XVII. cent.; ruthlessly exterminated owing to helplessness; inhabited forests; built flat open nest of grass; laid one large egg; said to have eaten pebbles; habitat, Mauritius.

DODONA, ancient sanctuary in Epirus, N.W. Greece; temple founded by Pelasgians and dedicated to Zeus; oak tree supposed to be seat of deity; responses of oracle given by leaves rustling.

DODS, MARCUS (1834-1909), Scot. Presbyterian theologian and Biblical scholar; charged with unorthodoxy before Free Kirk Gen. Assembly, 1878, and acquitted; prof. at Edinburgh, 1889.

DODSLEY, ROBERT (1703-64), Eng. author and publisher; author of *Cleone* and other successful plays; founded the *Annual Register*, 1759; leading publisher of his day.

DODSWORTH, ROGER (1585-1654), Eng. antiquary.

DOGBANE, or *Apocynum*, the name of a genus of Apocynaceæ which includes only three species. *A. cannabinum, the Canadian hemp*, and *a androsoemifolium*, or fly-trap, both grow in N. America, and are used in medicine.

DOG-DAYS (*Dies Caniculares*), the hottest period of the year generally reckoned now from July 3 to Aug. 11. Various dates, from July 3 to Aug. 15, were assigned for the first of the D. by the Greeks and Romans and various periods of duration from twenty to fifty-four days. They were generally associated with the influence of Sirius, 'the dog-star,' and, according to Pliny, began with its heliacal rising on July 19 (New Style). They were regarded by the ancients as the hottest and most unhealthy period of the year, and as being the direct cause of madness among dogs.

DOG FAMILY (*Canidoe*), a family of Carnivora (*q.v.*) with over 100 species found wild in all parts of the world except New Zealand, Madagascar, the West Indies, and some of the East Indian islands. They are distinguished by their long, sharp muzzles, their long legs, ending in five and four toes on the fore and hind feet respectively; they walk on the toes alone, and these are tipped with blunt, non-retractile claws. A good skeletal character lies in the teeth, which are very numerous, usually 41, 20 being in the upper, 21 in the lower, jaw. The fur of members of the dog family is generally of a dull uniform color, varying from white and grey to reddish-brown. They are carnivorous, feeding upon other mammals, cattle, sheep, goats, rabbits, etc., which many species hunt down in packs, or on smaller animals, such as mice, reptiles, fish, and even crabs. Most are nocturnal in habit.

The Common Wolf (*Canis lupus*) and its races are found only in the Northern hemisphere, but they are widely distributed over Europe, Asia, and America. They are large, fierce, and powerful animals, which hunt in packs, and, like jackals (*q.v.*) and domestic dogs, have a round eye-pupil and a bushy tail. Especially bushy are the tail and body of the North American Coyote (*Canis latrans*), although its body is smaller and its temper is less savage than that of the common wolf. Its food consists of small mammals, such as rabbits and birds.

Of true dogs the only wild form is the Australian Dingo (*Canis dingo*), although it is probably descended from a species introduced by man to Australia at an early date. It varies in color from red to black, and causes much destruction among sheep flocks.

The varieties of Domesticated Dogs, many and diverse though they be, are all included under one species (*Canis familiaris*), originally descended from wolves or jackals, or both. Their differences are probably due to varied intercrossings and to the efforts of man to breed types suitable for different purposes. Only a few examples can be mentioned. Amongst wolf-like forms with moderately sharp muzzles and erect ears may be reckoned the mongrel Pariah Dogs of Eastern European, Asiatic, and African villages, the Eskimo Dog, the Sheep Dog and Collie, and the Pomeranian. Deerhounds, Lurchers, and Greyhounds are distinguished by the fact that they hunt by sight, have long legs, and exceedingly long, sharp muzzles and slightly drooping ears. A more distinct ear-droop, associated with wider heads, thicker fur, and shorter legs, is seen in Spaniels, Setters, Newfoundlands, and Retrievers; while smooth coats, deep muzzles with overlapping lips, and large, drooping ears characterize Blood-, Otter- and Fox-Hounds. Bull-Dogs, Pugs, and Mastiffs have short muzzles with projecting under jaw, and Terriers, rough or smooth, have erect ears and a deep skull.

Several wild species exist, resembling, but differing anatomically from, the domestic dog, such as the bushy Racoon Dog (*C. procyonoides*) of S. America, the Wild Dogs of Asia, the Long-Eared Dog (*Otocyon megalotis*) and Cape Hunting Dog (*Lycaon pictus*) of S. and E. Africa, and the Bush Dog (*Icticyon venaticus*) of Northern S. America. Lastly must be mentioned the Foxes, valuable on account of their fur.

DOGE, name of chief official in republics of Genoa and Venice. About 700 A.D. the office was created in Venice. The d. held office for life, and frequent attempts were made to make the office hereditary. Gradually the people lessened the power of the d., and by the XIII. cent. the office was practically nominal; the real government was oligarchical. In Genoa the office dates from 1339. The office was abolished in both cities in 1797.

DOG FISH. See Sharks.

DOGGER BANK, BATTLE OF THE. Early on Jan. 24, 1915, a Ger. battle-cruiser squadron under Rear-admiral von Hipper was encountered in this vicinity by the Brit. battle-cruiser squadron under Vice-admiral Beatty, and a running fight ensued. At 9 a.m. action was opened by *Lion*, which fired on *Blucher* at a range of 10 m.; at noon *Blucher* sank, the British rescuing 120 of her crew, while bombed by German aircraft. Meantime Beatty had continued the pursuit towards Heligoland, when at 11:30 a steampipe on *Lion* was severed by a chance shot. He transferred to *Princess Royal*; but when he came up to the rest of the squadron, at 12:20 he found that the fight had been broken off about 70 m. from Heligoland. No Brit. vessel was lost, *Lion* being able with assistance to reach the Firth of Forth; Germans, besides loss of *Blucher*, suffered severe damage to *Derfflinger* and *Seydlitz*.

DOGGETT, THOMAS (*d.* 1721), Irish actor; founded (1715) sculling match for 'Doggett's Coat and Badge' for Thames watermen.

DOGMA means, in general, a principle, or doctrine, claimed to be laid down by authority. Thus a dogmatist is a person who makes positive assertions, without having the warrant of absolute evidence. In regard to the Christian religion the term is used as an authoritative expression of an article of faith, as represented by the Church's consciousness and recognized through her accumulated experience. It is also used to describe the collective body of tenets held at different periods in Church history.

DOGS, ISLE OF, peninsula, S.E. London, formed by bend of Thames opposite Greenwich; occupied by docks.

DOG STAR. See Sirius.

DOGWOOD, the English name given to several deciduous-leaved shrubs of the genus Cornus, typical of the order Cornaceæ. *C. sanguinea* is known as both dogwood and cornel.

DOL (48° 31′ N., 1° 51′ W.), town, Ille-et-Vilaine, France; XIII.-cent. cathedral; tanneries. Pop. 4,708.

DOLABELLA, PUBLIUS CORNELIUS (70-43 B.C.), Rom. general; *m.* Tullia, Cicero's dau.; notorious for profligacy and perfidy.

DOLBEN, JOHN (1625-86), Anglican divine; dean of Westminster, 1662; bp. of Rochester, 1666; abp. of York, 1683.

DOLCE, LUDOVICO (1508-68), Ital. poet, dramatist, and translator.

DOLCI, CARLO (1616-86), Florentine artist; subjects chiefly devotional.

DOLDRUMS, region of calms near the equator, between N. and S. trade-winds.

DÔLE (47° 7′ N., 5° 30′ E.), town, Jura, France; Gothic cathedral, coll., and library; Rom. remains; iron foundries. Pop. 15,000.

DOLE, CHARLES FLETCHER (1845), Unitarian minister, *b.* Brewer, Maine, bro. of Nathan Haskell Dole. He graduated from Harvard in 1868 and from the Andover Theological Seminary four years later. For a brief period he was professor of Greek at Vermont University. From 1876 and throughout the rest of his career he served as pastor of the Unitarian Church, Jamaica Plain, Boston. He wrote extensively on social and religious subjects.

DOLE, STANFORD BALLARD (1844), Hawaiian statesman, *b.* Honolulu, of American parentage. He was educated in the United States, graduating from Williams College, Mass., upon which he studied law in Boston and was admitted to the bar in 1868. Returning that year to Hawaii, he began to take an active part in the island's affairs. He entered its legislature and in 1887 was appointed an associate judge of the Supreme Court, resigning in 1893 to lead the revolution that overturned the monarchy. He formed and headed a provisional government and became president of the republic established the following year. With the annexation of the islands by the United States he was selected as governor of the territory, serving from 1900 to 1903, and thereafter was judge of the territory's Federal Court. In 1915 he retired.

DOLERITE, widely distributed igneous rock which is found associated with basalts; coarse-grained crystalline structure, occurring in dykes, sills, and lava streams. There are several varieties, including *quartz-dolerite* and *olivine-dolerite.* It is much in demand for road-making.

DOLET, ÉTIENNE (1509-46), Fr. humanist and printer; convicted of heresy and burned.

DOLGELLY (52° 44′ N., 3° 53′ W.), market town, capital of Merionethshire, Wales; tourist resort.

DOLGORUKI, VASILY LUKICH, COUNT (1672-1739), Russ. diplomatist.

DOLHAIN (50° 36′ N., 6° E.), town, on Vesdre, Liége, Belgium; occupies part of site of ancient *Limburg*; cloth manufactures.

DOLIUM. A mollusc belonging to the class Gastropeda and the order Pectinibranchia. Its name arises from the shape of the shell which somewhat resembles the Roman *dolium*, an earthenware cask used for storing food. The ish is carnivorous and secretes free sulphuric acid which assists it in boring holes through the shells of other shellish, which form its food. The shell is ventricose, with a short spire and wide perture. *Dolium galea* inhabits the Mediterranean, where it grows to a ength of ten inches, and is the largest mollusc of that region.

DOLL (of Gk. origin), diminutive of Dorothy'; a child's toy. Such playhings were used by the early Egyptians, nd by all races of the ancient as of he modern world.

DOLLAR, the unit of the monetary ystem of the United States, Canada and Mexico. The name is derived from the 'thaler,' a coin which originated in Bohemia, in 1519 and was widely used in Germany and the adjoining countries for many years afterwards, but the coin is taken from the Spanish 'duro' or 'peso,' the almost universal medium of exchange in the West Indies trade during colonial days. The Coinage Act, of 1792, merely gave legal recognition to what was then an established institution. This Federal legislation also fixed the standard value of the silver dollar as equivalent to 24.75 grains of pure gold, though no gold dollars were coined then. In 1834 the value was reduced to 23.20 grains of gold, but raised again in 1837 to 23.22 grains. In March, 1849, Congress authorized the coinage of a limited number of gold dollars. An Act, passed March 14, 1900, made the gold dollar a standard unit, but did not authorize its coinage. The present theoretical weight of gold dollar is 25.8 grains, fineness 900-1000. Standard silver dollar 412.5 grains, fineness 900-1000. Rates to gold 15.988 to 1.

DOLLAR (56° 10′ N., 3° 40′ W.), town, Clackmannanshire, Scotland; has celebrated academy (secondary school); ruined Castle Campbell; coal mines.

DOLLING, ROBERT WILLIAM RADCLYFFE (1851-1902), Anglican divine; extreme ritualist and worker in slums.

DOLLINGER, JOHANN JOSEPH IGNAZ VON (1799-1890), Ger. theologian; ed. at Würzburg and Bamberg; prof. at Munich, 1826. Though never in sympathy with Protestantism, came, through experience of Rom. *curia*, strongly to dislike doctrine of papal infallibility; most learned and able of those who opposed papal policy which culminated in declaration of infallibility at the Vatican Council of 1870; refused to submit, and was excommunicated.

DOLLIVER, JONATHAN PRENTISS (1858-1910), legislator and lawyer, *b.* Kingwood, W. Va. In 1873 he graduated from the West Virginia University, studied law, and upon admission to the bar, removed to Iowa, where he practiced at this profession. He early entered politics and came into public notice in the Blaine campaign of 1884. Gifted with great oratorical powers, added to a forceful mentality, he was sent to Congress in 1888 as a Republican representative from Iowa, and was re-elected to the House in six successive terms. In 1900 he was appointed to the Senate, where he served till his death. He acquired national fame as a U. S. Senator, especially as a leader of the insurgent Republicans who remorselessly attacked the Payne-Aldrich Tariff bill of 1909. He also took an outstanding part in promoting railroad-rate legislation and in augmenting the authority of the Interstate Commerce Commission.

DOLMAN, hussar's uniform jacket; woman's cape-like coat.

DOLNJA TUZLA (44° 29′ N., 18° 52′ E.), town, Bosnia; seat of Gk. bp.; considerable trade in salt, grain, livestock, timber, and coal. Pop. 12,000.

DOLOMIEU, DÉODAT GUY SILVAIN TANCRÉDE GRATET DE (1750-1801), Fr. geologist; traveled in many parts of Europe and in Egypt on geological expeditions; wrote several scientific works. Mineral *Dolomite* is named after him.

DOLOMITE, mineral occurring abundantly in the Permian system; chemical composition is: calcium and magnesium carbonate ($CaMg(CO_3)_2$); belongs to the same group of rhombohedral carbonates as calcite, and occurs as large rock masses in rhombohedral crystals, transparent and translucent; usually white or yellowish, but at times reddish-brown, green, grey, or even black.

DOLOMITES, THE (46° 25′ N., 11° 50′ E.), group of limestone mts., S. Tirolese Alps; principal peak, Marmolata, *c.* 11,000 ft.

DOLPHIN FAMILY (*Delphinidoe*), a family of toothed whales (*Cetacea, q.v.*) containing 63 species found in all seas. They possess teeth, usually numerous in both upper and lower jaws, and have no baleen or whalebone. There is only a single blow-hole, which is crescent shaped, the arms of the crescent directed forwards. Some of the common forms are the dolphin (*Delphinus delphis*) of the Atlantic Ocean and Mediterranean Sea, the jaws of which form a long beak; while its round-headed, beakless relatives include the Arctic narwhal (*Monodon monoceros*), with a long, horn-like tusk, in former days mistaken for the unicorn's horn; the cream-colored white whale or beluga (*Delphinapterus leucas*), also most common in Arctic Seas; the smaller (5 ft. long) gregarious porpoise (*Phocoena communis*), with dark back and white belly, found in the North Atlantic; and the black fish, pilot whale or ca'ing whale (*Globiocephalus melas*).

DOMAIN, PUBLIC, a term used in Europe to denote the public lands belonging to the Crown or State and especially to public works or property under state control such as roads, bridges, tunnels and canals. In the United States it is applied to undistributed or unappropriated lands still remaining in the possession of the National Government or a State.

Before the American Revolution the title to all vacant lands in the colonies was vested in the Crown. When independence was won, the ownership of the vacant lands passed to the individual states in which they were located. Many of the states had ill-defined boundaries in the West and so much bitterness was engendered by disputes that a solution was only reached when all the States ceded their claims to the central Government. The total area ceded was 404,956 sq. miles. The greater part of this was unoccupied save by Indians, whose claims to the property were extinguished by special treaties.

Additions were made to this public domain at later periods. Over 1,100,000 square miles were added by the Louisiana Purchase, 1803; 50,000 square miles by the acquisition of Florida, 1819; 522,568 square miles by cession from Mexico, 1848; 96,707 square miles claimed by Texas and ceded, 1850; 45,535 square miles purchased from Mexico, 1853. The purchase of Alaska in 1867 added an additional 570,000 square miles, and certain smaller acquisitions in Hawaii and the Philippines slightly augmented the total. Altogether, at one time or the other, the United States has held absolute ownership in about 3,000,000 sq. miles of land.

At first these vast possessions were regarded as a means of revenue, and were sold on liberal terms to prospective settlers. The survey plan of 1785, the pre-emption acts of 1841 and 1843 and the Homestead act of 1862 proved a great stimulus to settlement. Later, when the question of revenue was no longer paramount, large grants of land were made to railroads and to companies constructing canals, levees, turnpikes and other public works. Through gratuitous grants to States corporations and individuals and through sales, the more valuable part of the public domain has passed from the control of the Government, which now has about 1,400,000 square miles, mostly arid and mountainous, remaining. Many gross frauds have been practiced on the Government in the course of this alienation. Less open to criticism have been grants to soldiers of the Revolutionary war, the War of 1812 and the Mexican war. The bonus bills proposed but not passed, 1920-22, had as one of their provisions a distribution of land to veterans of the World War. By act of 1902, Congress decreed that the further proceeds from the sale of public lands should be devoted to the construction of irrigation works. Under the Roosevelt Administration, a Public Lands Commission was appointed to recommend legislation for the better management of the national domain. Grazing licenses, mining privileges and power rights were placed under stricter supervision. In 1910 Congress enacted that the President could withdraw from disposition any public lands, the decision to be in force until revoked by Congress. The Carey act of 1914 provided for a donation of 1,000,000 acres of desert land to any desert land State, on condition that the state should embark upon projects of irrigation and reclamation.

DOMAT, JEAN (1625-96), Fr. legal writer.

DOMBES (*c.* 46° N., 5° E.), ancient division, Burgundy, France; bounded by Rhône, Ain and Saône.

DOMBROWSKI, JAN HENRYK (1755-1818), a Polish general, served first under the Elector of Saxony, but from 1792-94 took part in the Polish campaigns against Russia and Prussia, gaining distinction during the siege of Warsaw under Kosciusko. In 1797 he left Poland and mustered for the French a legion of Poles at Milan. In the Italian campaign he was conspicuous for his bravery at the Trebbia,1799. With the divisions of Poles he had organized for Napoleon in 1806, he commanded in the Polish campaign of 1809, and during the fatal march on Moscow in 1812 was wounded whilst crossing the Beresina. For his reorganization of the Polish forces he was appointed cavalry-general in the new kingdom of Poland, 1815.

DOME, in arch., convex roof; sometimes employed by the Romans, but a characteristic feature of Byzantine architecture. Famous d's are St. Peter's and the Pantheon, Rome; St. Sophia, Constantinople; St. Paul's Cathedral, London, and the Capitol, Washington, D.C.

DOMENICHINO, ZAMPIERI (1581-1641), Ital. artist; *b.* Bologne; distinguished for his realism and as a colorist.

DOMESDAY BOOK, Eng. survey carried out by order of William the Conqueror, contained in two vol's (which are still preserved); N.W. England, part of which was not yet conquered, is not included. Each county is divided into *hundreds*, and entries are given of all land, its owner, livestock, peasants, etc.; of inestimable value as an historical source, particularly for genealogy and topography; by no means always easy to understand.

DOMESTIC ANIMALS. See CATTLE, SHEEP, PIGS, etc.

DOMESTIC SERVICE is the performance of so-called menial functions in a household. In the Old World it is a well-defined occupation and those who follow it as a life work frequently attach themselves to families all their lives. The pursuit has long since been controlled by tradition and social usage, which have classed domestics as inferiors, with the result that the work they do came to be viewed as degrading, especially as education spread. In England, where domestics grew to be a special class, the calling has a legal status. The law stipulates the conditions under which a servant may be engaged, paid and discharged. The march of modern democracy is fast breaking the bonds which have so long restricted domestic service to a plane of ignominious servitude, or so it has been popularly regarded under the old conditions. In the United States domestic servants have shown a spirit of independence and have raised the grade of their calling by organization. In democratic countries generally, especially outside Europe, there is a growing difficulty in securing adequate and efficient help, owing to the better hours, pay and social status of other callings.

DOMETT, ALFRED (1811-87), Brit. poet and statesman; premier of New Zealand.

DOMICILE, fixed place of residence; the country where one's home is. A person's civil status depends on his d.

DOMINIAN, LEON (1880), geographer; *b.* Constantinople, Turkey. Educated at Robert College, an American institution in Constantinople, where he received the B.A. degree in 1898, he studied geography and geology for two years thereafter at Liége University. Later he traveled in Turkey, joined the U.S. Geological Survey, taught in the New Mexico School of Mines and traveled in the Southwest and in Mexico. From 1912 to 1917 he was a geographer and editorial writer for the American Geographical Society and became engaged in the solution of Latin-American boundary questions for the U. S. State Department. He was with the American Peace Commission in Paris in 1918. The next year he was appointed a special assistant to the State Department. His publications include *Europe at Turkey's Door* and *The Frontiers of Languages and Nationality in Europe.*

DOMINIC, ST. (1170-1221), founder of Dominican Order; canon of Osma in Old Castile, 1195. From 1205-15 D. devoted himself to the Albigensian heretics of Languedoc, preaching and teaching and not resorting to violence of later Inquisition; closing years occupied in establishing his order; canonized by Gregory IV., 1234.

DOMINICA, DOMINIQUE (15° 25′ N., 61° 20′ W.), island, Leeward group, Brit. W. Indies; surface mountainous; well covered with timber; fertile valleys, watered by numerous streams; of volcanic origin; contains sulphurous and thermal springs and famous 'Boiling Lake'; principal harbor, Portsmouth, on St. Rupert's Bay on N.W. coast; capital, Roseau; exports sugar, coffee, cocoa, limes, oils, fruit. D. was discovered by Columbus on a Sunday (*Dies Dominica*) in 1493. In 1761 Britain took the island from France, and by the Peace of Paris, 1763, it was recognized as British. Fr. settlers again seized D., 1778, but in 1782 Rodney won a naval victory in the neighborhood, and Britain again acquired the island. In 1805 a Fr. army plundered the island. Area, 291 sq. miles. Pop. 1921, 37,000. See MAP WEST INDIES.

DOMINICAN REPUBLIC, Republic, eastern portion of island of Haiti, W. Indies; surface generally mountainous, with fertile valleys between ranges; climate is hot in low districts, cooler in higher lands; large deposits of rock salt in S.W.; rich in minerals, but little worked; exports are coffee, cocoa, sugar, tobacco, logwood, mahogany, cotton, hides, copper; inhabitants are of mixed European and African descent. Country formerly belonged to Spain; became independent republic, 1821; civil war, 1906. In 1916, following civil war in the country, the United States intervened and established a military government on November 29. This was placed in the hands of the U.S. Navy under a military governor. This continued during the years following, despite the protests of native officials. In 1921 the President of the Republic appealed to the President of the United States to withdraw American influence and rule, but this was refused unless certain conditions were fulfilled. A commission of the United States Senate which visited San Domingo reported on December 29, 1921 that the political leaders had refused to accept these conditions, so that American rule continued in 1922-3. Area, 19,332 sq. m.; pop. *c.* 955,200. (2) City, cap. of above (18° 28′ N., 69° 54′ W.); archbishop's see; exports tobacco, sugar; wireless station. Pop. *c.* 26,800. See MAP WEST INDIES.

DOMINICANS, Friar Preachers, or *Black Friars* (from their habit), founded by St. Dominic, 1215; organized in two Chapters at Bologna, 1220-21; order to be governed by a master-general, to live at Rome; the rule of life was strict, and the order was to possess no property. Its spread was very wide.

DOMINIS, MARCO ANTONIO DE (1560-1624), Ital. theologian; bp. of Segni; abp. of Spalatro; left Rom. and joined Eng. Church, 1616, becoming Dean of Windsor.

DOMINOES, game, which became popular in XVIII. cent., played usually with 28 oblong, ivory-faced pieces, or 'cards,' each piece being numbered from blank to 12.

DOMINUS, Latin equivalent of 'sir' or 'master,' formerly applied to knights, parsons, or landed proprietors.

DOMITIAN, TITUS FLAVIUS DOMITIANUS, Rom. emperor (81-96 A.D.); *s.* of Vespasian; succ. his bro. Titus; attempted some reforms, but personally vicious; condemned his cousin, Flavius Clemens, for friendliness to Christianity; killed by a freedman.

DOMRÉMY-LA-PUCELLE (48° 27′ N., 5° 40′ E.), village, Vosges, France; birthplace of Joan of Arc.

DON (57° 13′ N., 2° 6′ W.), river, Aberdeenshire, Scotland; flows into North Sea, 1½ miles N. of Aberdeen.

DON (47° 10′ N., 39° 10′ E.), river, Russia; ancient *Tanais*; rises in Lake Ivan, flows generally S. through Don Cossacks district, enters Sea of Azov, forming delta 130 sq. m. in extent; length, *c.* 1,156 miles; important fisheries; navigable for 800 miles above mouth; in upper course connected with Volga by canal and railway.

DON BENITO (38° 55′ N., 5° 51′ W.), town, Badajoz, Spain; brandy, woolens, wheat, wine, and fruit. Pop. 16,565.

DON JUAN, DON GIOVANNI, hero of Span. story. He seduced a young lady and killed her father in a duel. The statue of the father ultimately dragged D.J. down to hell. The story was dramatized by Tirso de Molina, the Span. author, and has been treated by Molière, Byron, Dumas, and Mr. Bernard Shaw (in *Man and Superman*). Many operas have been composed on the theme, notably Mozart's *Don Giovanni*, and Zorilla's *Don Juan Tenorio*.

DONAHUE, PATRICK JAMES (1849), a bishop, *b.* at Malvern, Worcestershire, Eng. He graduated from the University of London in 1869 and came to the United States four years later and after studying law at Columbian (now George Washington) University he was engaged in the practice of law at Washington from 1876-82. He later studied at St. Mary's University, Md., and was ordained in the Roman Catholic Ministry in 1885. He was archdiocese, Baltimore, from 1886-91, rector of Baltimore Cathedral from 1891-4 and was consecrated bishop of Wheeling, April 8, 1894.

DONAJETZ, DUNAJETZ, or **DUNAJEC,** S. trib. of the Vistula, in W. Galicia, rises in foothills of Carpathians and joins main stream about 40 m. N.E. of Cracow (50° 16′ N., 20° 46′ E.). In April 1915 Russian lines lay along E. bk. of Donajetz and its affluent the Biala; throughout the winter Germany had secretly accumulated gigantic artillery strength on this front, and on April 28 launched a grand offensive, which by May 1 brought about a 'break-through' that soon compelled all the Russian armies to retreat. See WORLD WAR.

DONATELLO, DONATO DI BETTO BARDI (1386-1466), Ital. sculptor; *b.* Florence; perhaps the greatest master of the Early Tuscan school. His reliefs are well known, but his fame rests mainly upon his statues in Florence, (*e.g.*) *St. George* and *David.*

DONATIO MORTIS CAUSA, legal term for a gift of property to become operative in event of the donor's death.

DONATION OF CONSTANTINE, traditional grant of both spiritual and temporal authority over Italy and provinces to Popes by Charles the Great; accepted as authentic in mediæval times, but now universally regarded as forgery (first attacked by Laurentius Valla, 1444;) date and place not quite certain, but probably at Rome, *c.* 775 A.D.; spuriousness now admitted by R.C. scholars.

DONATIS COMET. See COMET.

DONATISTS, a sect of Christians in N. Africa in the IV. cent., who separated from the Church on the election of Bp. Cæcilian of Carthage, 311, over the question of the *lapsi* (lapsed), (*i.e.*) whether these Christians who had fallen away in times of persecution ought to be received back to the Church. The D's stood for merciless severity; the Councils of Arles, 314, and Milan, 316, pronounced against them, as also finally Carthage, 411; they continued to exist till the VI. cent.

DONATO, GIUSEPPI (1881), a sculptor, *b.* at Maida, Province of Catanzaro (Magna Grecia), *s.* of Antonio and Teresa Maria Bilotta Donato. He came to America in 1892. After graduating from the Philadelphia Public Industrial Art School in 1897, he studied at the Pennsylvania Academy of Fine Arts. He then received private instructions in drawing and anatomy and later studied modeling and architecture at the Pennsylvania Museum of Industrial Art, after which he studied at the Acad. Julien and the Acad. Colorossi, Paris, and was also a private student under Auguste Rodin. He exhibited at the Grand Salon, Paris, the National Academy of Design, N.Y., and other important places of exhibition and received many awards.

DONATUS, ÆLIUS (IV. cent. A.D.), Rom. rhetorician and grammarian.

DONAUWÖRTH (48° 43′ N., 10° 46′ E.), town, at confluence of Wörnitz and Danube, Bavaria; several ancient buildings; machinery; here Allies defeated French, 1704; French defeated Austrians, 1805. Pop. 5,000.

DONCASTER (53° 32′ N., 1° 8′ W.), market town, on Don, W. Riding, Yorkshire, Eng.; celebrated for annual race-meetings (St. Leger), dating from 1776; locomotive and carriage works of Great Northern Railway. Pop. 32,000.

DON COSSACKS (48° 30′ N., 42° E.), a republic, formerly a government, S.E. Russia, in valley of Lower Don; belongs almost entirely to Steppe region; elevated in N. and W.; soil very fertile; mineral products—iron, salt, gypsum; agriculture, cattle breeding, fishing, important industries; extensive vineyards; iron-works, tobacco factories, tanneries, flour-mills. Area, 63,532 sq. miles. Pop. 3,500,000.

DONEGAL (54° 54′ N., 7° 55′ W.,) county, Ireland, in Ulster (*q.v.*); bounded N. and W. by Atlantic and Donegal Bay, S. and E. by Londonderry, Tyrone, and Fermagh; chief river, Foyle; largest lough, Derg. D. produces granite, white marble, and freestone; manufactures include woolens and worsteds; extensive fisheries. Capital is Lifford; other towns: Ballyshannon, Letterkenny, Rathmelton, and Donegal. D. has ruins of forts, churches, castles, etc.; palace of N. Irish kings near Lough Swilly. Pop. 170,000.

DONEGAL (54° 39′ N., 8° 6′ W.), market town, seaport, County Donegal, on Donegal Bay, Ireland; ruins of Franciscan monastery.

DONEY, CARL GREGG (1867), an American college president, *b.* at Columbus, Ohio, *s.* of Abram Covert and Emily Victoria Brock Doney. He was educated at Ohio State University and at Harvard. He entered the M.E. ministry in 1893 and was a pastor until 1907 when he became president of West Virginia Wesleyan College, which position he resigned in 1915 to become president of

Willamette University, Salem, Ore. In 1917 he was connected with the War Work Council and the following year lectured for the Y.M.C.A. in France. Author: *The Throne Room of the Soul*, 1906, and *An Efficient Church*, 1907.

DONGOLA, province in Anglo-Egyptian Sudan (18°-20° N., 30°-33′ E.), extending along both banks of Nile, which waters fertile districts; cap., Merowê; Nubian Desert lies E.; Libyan Desert, W. The Wadi-el-Kab (*c.* 60 m. long) has good arable land; chief grain crops are durra and barley; dates extensively cultivated; fine horses bred; retaken from Mahdi by Kitchener, 1896. Area, *c.* 141,000 sq. m.; pop. 56,000. See Map Africa.

DONGOLA, NEW (19° 10′ N., 30° 30′ E.), superseded Old D., now a ruined city, 75 miles farther up the Nile, as largest town of D. province (*q.v.*)

DONIPHAN, ALEXANDER WILLIAM (1808-1887), army officer and lawyer; *b.* Mason County, Kentucky; *d.* Richmond, Mo. He graduated from Augusta College and studied for the bar. Upon being admitted in 1830, he first practiced at Lexington, Mo., then at Liberty, in Clay County, where he lived for thirty years and established for himself a foremost place among Missouri jurists. He represented the county in the state legislature for several terms. As a conspicuous figure in the State militia, commanding the first brigade, he took a part in the expulsion of the Mormons from Missouri in 1838. The Mexican War in 1846 found him serving under General Stephen W. Kearny as colonel of a regiment of Missouri mounted volunteers. With only 924 men he made a weary march early in 1847 through the desert for 250 miles, only to encounter a force of 4,000 Mexicans strongly entrenched in the pass of Sacramento. Giving battle despite his exhausted mounts, he routed the enemy and captured their artillery and large supplies of ammunition and equipment. His troops suffered only one killed and seven wounded, while the Mexicans left 304 dead on the field. The victory opened the way to occupying the State of Chihuahua, and the next day, March 1, he entered the capital. After the war he returned to Liberty and resumed the practice of law. He was one of the peace commissioners who met at Washington in 1861 in a vain conference to avert the outbreak of the Civil War.

DONIZETTI, GAETANO (1797-1848), Ital. composer; *b.* Bergamo; very rapid and prolific opera writer; over 60 operas, some of which rank among best of Ital. style; most successful—*Lucia di Lammermoor*, *The Daughter of the Regiment* and *La Favorita.*

DONJON. See Castle.

DONKEY. See Mule.

DONKEY ENGINE. Relatively small engines used to drive the auxiliary apparatus of a larger engine installation, are sometimes known by this name. The term is also applied to engines driving pumps, hoists, etc., used in construction work and aboard ships. Many sailing ships carry a donkey engine which is used to hoist the sails, load and unload the cargo and to haul up the anchor. These engines are generally of the horizontal type, and have two double acting cylinders, geared to a drum or 'head,' around which the rope to be pulled is wound. They are rarely rated at over 50 H.P.

DONNAY, CHARLES MAURICE (1859), Fr. dramatist; *L'Autre Danger*, *Education de Prince*, and other problem plays; member of Fr. Academy.

DONNE, JOHN (1573-1631), Eng. poet and clergyman; brought up as R.C.; ed. Oxford; studied law; accompanied Essex to Cadiz and the Azores, 1596-97; later changed his faith, pub. his anti-Catholic *Pseudo-Martyr*, was ordained, and became chaplain to James I.; held various livings, and was made Dean of St. Paul's, 1621. He was a powerful and popular preacher; pub. several vol's of sermons; and is deservedly famed for his poetry. He was the greatest of the Metaphysical Poets (*q.v.*)

DONNELL, ANNIE HAMILTON (1862), an American authoress, *b.* at Kents Hill, Me., daughter of Albert H. and Mary C. Robinson Hamilton. She graduated from the Woman's College at Kents Hill in 1881 and married Webb Donnell, of Kents Hill five years later. In addition to contributing to various magazines she was the author of: *Camp Fidelity Girls*, 1903; *Rebecca Mary*, 1905; *The Very Small Person*, 1906, and *Miss Theodosia's Heartstrings*, 1916.

DONNYBROOK, S.E. suburb of Dublin; formerly a village; King John gave permission for holding an annual fair, which became notorious for rioting, and was abolished, 1855.

DONNELLY, IGNATIUS (1831-1901), an American author, born in Philadelphia. Representative in Congress, 1863-69; nominated for vice-president twice, but not elected. He was interested in the Bacon-Shakespeare controversy, and wrote *Great Cryptogram*, 1887; and *Cipher in Shakespeare's Plays*, 1900.

DONORA, a borough of Pennsylvania, in Washington co. It is on the Pennsylvania, the Pittsburgh and Erie railroads, and on the Monongahela river. It is the center of an extensive coal mining and agricultural region. It has manufactures of steel wire, chemicals and gas mantles. Pop. 1920, 14,131.

DONOSO CORTES, JUAN, MARQUIS DE VALDEGAMAS (1809-53), Span. diplomatist and author.

DONOVAN, EDWARD (*d.* 1837), Eng. naturalist; writer of popular books on natural history.

DON QUIXOTE. See CERVANTES.

DOOBAUNT (63° 30′ N., 101° 30′ W.), lake, N.W. territory, Canada; receives Doobaunt, a small river, on west.

DOON DE MAYENCE, prominent figure in the Charlemagne epic cycle.

DOON LOCH (55° 15′ N., 4° 22′ W.), lake, Ayrshire, Scotland; length, 6 miles; surrounded by hills; through it flows river Doon.

DOORS, originally acted also as windows and were hinged with socket and peg; classic d's, either single or double, were surmounted by moulding (architrave) and often by frieze and cornice; the arch appeared in late Roman doorways. Gothic d's frequently possess central pilaster and nicely ornamented portals; d. generally of wood with metal ornamentation. D's are used to separate water-tight compartments on ships; folding and sliding d's are used to save space.

DORAN, DR. JOHN (1807-78), Eng. writer on social history and antiquities.

DORAT, CLAUDE JOSEPH (1734-80), Fr. author; wrote novels, plays, and poems.

DORCHESTER, (50° 43′ N., 2° 25′ W.), market town, on Frome, Dorsetshire, Eng.; valuable Rom. remains; has grammar school, founded 1579; museum of antiquities; center of agricultural district. Pop. 10,000.

DORCHESTER, DUDLEY CARLÉTON, VISCOUNT (1573-1632), Eng. diplomatist; ambassador to Holland, 1616; supported Charles I.; cr. Viscount D., 1628.

DORCHESTER, GUY CARLETON, 1ST BARON (1724-1808), Brit. general; served in Canada under Wolfe; gov.-gen. of Canada, 1766-78; wise and tactful ruler.

DORDOGNE (45° 5′ N., 0° 40′ E.), department, S.W. France; surface in N., mainly sterile plateaux; large area is forest, with few fertile valleys; minerals, wine, truffles. Area, 3,561 sq. miles. Pop. 1911, 435,000.

DORDRECHT, DORT (51° 49′ N., 4° 40′ E.), town, on R. Merwede, province of S. Holland, Netherlands; picture gallery; birthplace of John De Witt and two Cuyps; sawmills. Pop. 50,000.

DORÉ, LOUIS AUGUSTE GUSTAVE (1833-83), a book illustrator, drew first for the *Journal Pour Rire*, 1848, and later for the *Journal Pour Tous*. His drawings show genius for grotesque and humorous illustration as also fertility of invention and preference for the fantastic. Among the works he illustrated were: Balzac's *Contes Drolatiques*, 1855; Dante's *Inferno*, 1863; *Purgatorio and Paradiso*, 1865-66; *The Bible* and *Paradise Lost*, 1866; Tennyson's *Idylls*, 1867-68; La Fontaine's *Fables*, 1867, and Rabelais' work. In the Luxembourg hangs his 'Tobit and the Angel,' whilst the Doré Gallery in London was long decorated with his huge canvases depicting 'Christ leaving the Prætorium,' 1867-72, etc.

DOREMUS, ROBERT OGDEN (1824-1906), professor of chemistry, *b.* New York City. He studied at New York University, from which he graduated in 1842, and later lived in Paris as a student of chemistry. In 1848 he returned to New York, where he established a laboratory and became professor at the College of Pharmacy. After serving, 1843 to 1861, as professor of natural history at the Free Academy, now the College of the City of New York, he headed the department of chemistry and toxicology at Bellevue Hospital, of whose Medical College he was one of the founders. Afterwards he was professor of chemistry and physics of the College of the City of New York. He devised methods of fire extinguishing by chemical processes and patented other scientific discoveries. He acquired considerable fame as a chemical specialist in New York criminal cases.

DORIA, ANDREA (1466-1560), Genoese admiral; served both Charles V. and Francis I.; fought for Genoa, 1503 onwards; drove French from Genoa, and became censor, 1528; famous for naval exploits against Turkish Corsairs.

DORIANS, name given to one of the chief Hellenic peoples who are traditionally said to have been first settled at Doris, near Mount Parnassus, but they later occupied most of the country along the northern coast of the Gulf of Corinth and subsequently, invading the Peloponnesus, founded the Spartan kingdom,

DORIC ORDER. See ARCHITECTURE.

DORIGNY, SIR NICHOLAS (1657-1746), a French engraver, was recognized in Rome, where he passed twenty-eight years, as second only to Girard Audran among his countrymen as an historical engraver. From 1711 to 1719 he worked for Queen Anne at Hampton Court, engraving the cartoons of Raphael. Heaviness of outline, hard contrasts, and excess of vigor mar most of his reproductions of Italian paintings, but his 'Transfiguration after Raphael' is good.

DORIS (38° 42′ N., 22° 20′ E.), in ancient geography, small mountainous district, S. of Thessaly, Greece.

DORISLAUS, ISAAC (1595-1649), Eng. judge and diplomatist; assisted in preparing charge of treason against Charles I.; murdered at The Hague.

DORKING (51° 14′ N., 1° 20′ W.), market town, on Mole, Surrey, England; gives name to breed of poultry. Pop. 8,000.

DORMER, window in a small gable which projects from the slated roof of a house; first employed about XIV. cent.

DORMOUSE, small animal of nocturnal habits; common d. (*Muscardinus avellanarius*) belongs to family of Gliridæ or Myoxidæ; tawny in color, with long, bushy tail; hibernates throughout winter; resembles squirrel in habits and food.

DORNBURG (51° N., 11° 40′ E.), town, grand duchy of Saxe-Weimar, Germany; famous for its three grand-ducal castles.

DORNER, ISAAC AUGUST (1809-84), Ger. Prot. theologian; prof. successively at Tübingen, Kiel, Königsberg, Bonn, Göttingen, and Berlin; best-known work, *History of the Development of the Doctrine of the Person of Christ.*

DOROHOI, DOROGOI (47° 48′ N., 26° 31′ E.), town, Moldavia, Rumania; is market for timber and produce of district; holds great annual fair. Pop. 14.000.

DOROTHEUS (*fl.* 530), Syrian writer on jurisprudence, who, at the instance of Emperor Justinian, prepared with others a book of *Institutes.*

DORPAT, a town of Esthonia. In the 14th and 15th centuries it was a Hanse town. It was captured successively by the Swedes, Poles and Russians. It has a famous university. It is now called Yuriev. Pop. about 45,000.

DORR REBELLION, THE (1840-42), movement under T. W. Dorr to change state constitution with more equal representation in Rhode Island; government with Dorr as head elected April, dispersed June, 1842.

D'ORSAY, ALFRED GUILLAUME GABRIEL, COUNT (1801-52), Fr. man of fashion and London dandy; close friend of Countess of Blessington; he was author, painter, and sculptor; became Director of Fine Arts in Paris, but died a few days after appointment.

DORSETSHIRE, DORSET (50° 50′ N., 2° 15′ W.), county, S. of England; bounded N. by Wiltshire, N.W. by Somerset, W. by Devon, S. by Eng. Channel, E. by Hampshire; area, *c.* 978 sq. miles; fine chalk-cliff scenery on coast; manufactures paper, flax, hemp, pottery. Principal towns, Dorchester—on Frome (county town), Bridport, Poole, Weymouth, Swanage, Wareham, and Shaftesbury. There are several ruined abbeys and castles; Sherborne, and Corfe Castle in Isle of Purbeck. Pop. 1921, 228,258.

DORT, SYNOD OF, held at Dordrecht by Dutch Reformed Church in 1618-19; upheld *Calvinism* against *Arminianism*; a most important date in history of Reformed Church.

DORTMUND (51° 32′ N., 7° 30′ E.), town, on Emster, Westphalia, Germany; has several fine old churches; is important industrial center; extensive coalfields; has iron and steel works and breweries. Pop. 1919, 295,026.

DOSTOIEFFSKY, FEODOR MIKHAILOVITCH (1818-81), Russ. novelist; wrote very powerful stories dealing with peasant life and social problems, his masterpiece being *Crime and Punishment* (Eng. trans., 1885).

DOTHAN, a city of Alabama, in Houston co., of which it is the county seat. It is on the Atlantic Coast Line, the Central of Georgia, and other railroads. Its industries include cotton compresses and manufactures of fertilizers, cottonseed oil and lumber. Pop. 1920, 10,034.

DOTY, MADELINE ZABRISKIE (MRS. ROGER N. BALDWIN) (1879), an American reformer, *b.* at Bayonne, N.J., daughter of Samuel W. and Charlotte G. Zabriskie Doty. She was educated at Smith College and at New York University. After studying law at the latter institution she was admitted to the bar in 1903 and was engaged in the general practice of law in New York for four years, but gave up law for welfare work. She was secretary of the Children's Court Committee of the Russell Sage Foundation and was also a member of the Prison Reform Commission of New York voluntarily spending a week in prison to investigate conditions and make a report. In 1915 she went abroad and until 1919 traveled extensively throughout Europe and contributed articles on Warring Countries of Europe to American and English newspapers. She was the author of: *Society's Misfits*, 1916; *Short Rations, an American Woman in Germany*, 1917, and *Behind the Battle Line*, 1919. She married Roger N. Baldwin in 1919.

DOUAI, or **DOUAY,** town, dep. Nord, France (50° 23′ N., 3° 3′ E.), on riv. Scarpe, 17 m. S. of Lille; principal buildings, church of Notre Dame, 12th to 14th cent., and Hôtel de Ville, partly 15th cent.; an Eng. trans. of the O.T. published by the Eng. Benedictine Coll. (founded 1568, closed 1903), along with the N.T. version published at Reims in 1582, known as the Douay Bible, is still the standard R.C. Eng. version. The town has sustained several sieges; finally ceded to France by Treaty of Utrecht, 1713; before the World War it was an important industrial center, with iron and engineering works, ammunition factories, besides sugar refineries, breweries, wool, paper, and leather factories and glass works. Pop., town, 23,000; comm., 36,000. In Aug. 1914 the tide of Ger. invasion swept past Douai, which after the battle of the Marne became an object of attack by both sides, as it was an important center of communications; held for a week by Fr. Territorials; Germans after their entry, Sept. 28, pillaged and burned; château was for a time headquarters of army group of Prince Rupprecht of Bavaria; town frequently visited by Kaiser; entered by British, Oct. 17, 1918, Germans committing wanton destruction before evacuation; the treasures stolen from the museum and churches were recovered in a railway van near Charleroi.

DOUAI BIBLE. See Bible.

DOUARNENEZ (48° 5′ N., 4° 15′ W.), town, on Bay of Douarnenez, western France; sardine-fishing and rope-making. Pop. 14,000.

DOUAUMONT, FORT, one of the outlying defenses of Verdun, France, forming the northeast angle of the outer circuit of the fixed fortifications, of great strategic importance, and therefore the object of the concentrated and persistent attacks of the Germans, when they made their great general attack on Verdun, in February, 1916. After a week of steady bombardment, in which the fort itself was reduced to a crumbling heap of concrete, the Germans poured in such a mass of infantry that the remains of the fort were taken, on February 26th. During that day's fighting, centering around the fort, the Germans lost approximately 100,000 men. Having possessed themselves of the ruined fort, the Germans set about reconstructing the defenses, creating a system of underground trenches even more intricate than that which they had destroyed in taking the hill on which the fort stood. The French efforts to retake this position were continuous. On May 22 the Fr. expelled the Germans temporarily, but were only able to hold it two days. It was not till October 24, 1916, that Douaumont was finally recaptured by the French, and the Germans lost their hold on what they had termed 'the main pillar of the Verdun defenses.' It marked the turn of the tide against Germany.

DOUBLE-BASS, stringed instrument larger than 'cello; usually with four strings, tuned in fourths; owing to unwieldiness it takes subsidiary part in orchestra, though Beethoven sometimes gives it prominence.

DOUBLE CONSCIOUSNESS, or dual personality, a psychological condition in which two or more personalities manifest themselves in one person. In this condition may be found the origin of the ancient belief in demoniacal 'possession.' After a brief period of depression, there is a sudden change of behavior on the part of the patient, and what is to all purposes a different personality manifests itself, this secondary personality having no memory of the real self. Dr. Morton Prince reports cases of where not only two personalities have thus manifested themselves in one person, but in the case of Miss Beauchamp, his famous patient, there were four, each quite distinct from the other. It is typical that the real, or primary personality, has all the characteristics of melancholia, while the alternate personality is gay and vivacious, of cheerful temperament. In Miss Beauchamp's case, one of the personalities would correspond with the other, writing letters which would be read by the primary personality as though it had been actually received from another person, and answering them in the same spirit.

Frederic Myers mentions an instance in which a Frenchwoman was afflicted with this disorder for a period of over twenty years, at the end of which period the secondary personality had become predominant, the primary personality finally ceasing to manifest itself. The cause of this peculiar disorder is ascribed to the abnormal activity of the subconscious mind, or subliminal mind (see AUTOSUGGESTION), which asserts itself and for periods displaces the conscious mind, or, rather, enters the field of consciousness and usurps the place of the conscious personality. A similar condition is manifested in the trance of a medium, who seems for the time being to be possessed of a discarnate being, and which may be accounted for by the same theory; the temporary manifestation of the subconscious mind.

DOUBLEDAY, ABNER (1819-1893), an American soldier, *b.* in Ballston Spa, N.Y. In 1842 he graduated from the United States Military Academy. He took a distinguished part in the Civil War, and was second in command at Fort Sumter, in 1861, where he fired the first gun in its defense. He also greatly distinguished himself at the battle of Gettysburg, and took a prominent part in other important engagements. He was brevetted lieutenant-colonel in 1865 and in 1870 was promoted to the rank of colonel in the Regular Army.

DOUBLE STARS. See BINARY STARS.

DOUBS (47° 10′ N., 6° 25′ E.), department, E. France, formed of part of ancient Franche-Comté; capital, Besançon; watered by Doubs and affluents; traversed by Jura mountains; good mountain pastures; plains produce wheat, oats, vines, fruit; chief industries, watchmaking, iron-founding, brandy-distilling. Area, 2,030 sq. miles. Pop. 300,000.

DOUGH. See BREAD.

DOUGHERTY, PAUL (1877), an American artist, *b.* at Brooklyn, N.Y., son of J. Hampden and Alice Hill Dougherty. He was educated at Brooklyn Poly. Institute and at New York Law School and later traveled and studied art alone for five years at Paris, London, Florence, Venice and Munich. He exhibited at the Paris Salon, National Academy of Design, Carnegie Institute, Pittsburgh; also Venice, Berlin and Rome and was awarded many prizes for his work. He is represented in the permanent collections of the Metropolitan Museum of Art, the Corcoran Gallery of Art at Washington and other important art galleries and institutes throughout the United States.

DOUGLAS, a town of Alaska, on Douglas Island, opposite Juneau. It contains the famous Treadwell gold mines.

DOUGLAS, a city of Arizona, in Cohise co. It is on the El Paso and Southwestern railroad, and is the terminal point of the Nacozari railroad. It is the center of a great copper producing region and has large copper smelters and also plants for the manufacture of gypsum, cement and plaster. Pop. 1920, 9,916.

DOUGLAS (54° 9′ N., 4° 29′ W.), seaport, capital of Isle of Man. House of Keys, meetingplace of Manx Legislature, is at D.

DOUGLAS, FAMILY OF, famous in Scot. history, dates from XII. cent. Sir James, 'The Good', 1286-1330, commanded part of Bruce's army at *Bannockburn,* 1314; he *d.* in Spain while carrying Bruce's heart to Palestine. The 1st Earl of D. was William, cr. 1358. The 2nd earl, James, who was slain at *Otterburn,* 1388, left no legitimate *s.*, and the earldom went to Archibald, 'The Grim,' natural *s.* of Sir James, 'The Good.' His *s.*, Archibald, became 4th earl, 1372-1424; fought in France, and was slain at Verneuil. Archibald, 5th earl, *d.* in 1439, and his *s.*, William, 6th earl, a mere boy, was murdered along with his bro. in Edinburgh Castle, 1440. This incident—the 'Black Dinner of the Douglases'—broke the family's power, and its lands were forfeited. The D. lands proper fell to James, 'The Gross,' 7th earl. His *s.* William, 8th earl, restored the power of the 'Black Douglases,' and James II., alarmed at the strength of the family, treacherously murdered William at Stirling, 1452. His bro., James, 9th, and last, earl, took arms to avenge William's death; was unsuccessful. The title died in 1857.

DOUGLAS, ARCHIBALD, 5TH EARL OF ANGUS (1449-1514), Scot. nobleman.

DOUGLAS, GAVIN, GAWAIN (*d.* 1522), Scot. poet and bp.; third *s.* of Archibald, *Bell the Cat*; held the see of Dunkeld, 1515-20; pub. first Eng. trans. of Virgil's *Aeneid* (with prologues of his own); original allegorical poems, *King Hart,* and *The Palice of Honour.*

DOUGLAS, GEORGE (1869-1902), pseudonym of George Douglas Brown, Scot. author; wrote *The House with the Green Shutters,* 1901.

DOUGLAS, STEPHEN ARNOLD (1813-61), an American statesman, the son of a doctor, born at Brandon in Vermont. After having entered upon business life he decided to study law, and was called to the bar in 1834 at Jacksonville in Illinois, where he took an active part in politics. He was judge of the Supreme Court from 1841-43, and in that year became a member of the House of Representatives. While in parliament he did a great deal to further the annexation of Texas, and was the originator of 'Popular Sovereignty,' (*i.e.*) allowing a state to vote itself slave or free. In 1860, in his struggle for the presidency, he was unsuccessful, being defeated by Abraham Lincoln, but during the Civil War which followed he upheld Lincoln's power and did his utmost to preserve unity in the states.

DOUGLASS, FREDERICK (1817-95), an American journalist and orator. He was born at Tuckahoe in Maryland, and was at first brought up as a slave, for his father, who was a white man, had married a negro slave. In 1838 he managed to free himself by escaping from a shipyard in Baltimore, and he then assumed the name of D. instead of Bailey, his original one. After living at New York and then New Bedford, he was appointed a lecturer by the Anti-Slavery Society on account of his eloquence. He published *Frederick Douglass's Paper*, on the abolition of slavery, and in addition he filled some important offices, among them marshal for the district of Columbia, and minister to Haiti.

DOUKHOBORS, or **DUKHOBORS,** a body of Russian Nonconformist peasants, formed about 1750, holding property in common; like Quakers, reject ritual and a professional priesthood; persecuted by the Russian Government from time to time; migrated to Cyprus, 1898; thence to Canada, 1899, to the number of 7,500. Tolstoy sympathized with them, and they largely practice his simplicity of life and belief.

DOULLENS (50° 10′ N., 2° 20′ E.), town, Somme, France; mediæval stronghold; besieged and occupied by Spaniards, 1595; restored to France, 1598. Pop. 5,300.

DOULTON, SIR HENRY (1820-97), Eng. potter; head of the famous Lambeth firm of drain-pipe and *Doulton ware* manufacturers.

DOUMER, PAUL (1857), Fr. politician and author; was minister of finances 1895-6, gov.-gen. of Indo-China 1897-1902; president of the Budget Commission, 1902-4, and of the Chamber of Deputies 1905-6; was elected senator 1912, and became minister of state in the short-lived administration of M. Painlevé 1917; author of *L'Indo-Chine Francaise*, *Livre de mes Fils*, etc.

DOUNE (56° 11′ N., 4° 3′ W.), town, on Teith, Perthshire, Scotland; remains of feudal castle.

DOURO, DUERO (41° 6′ N., 8° 34′ W.), river, Spain and Portugal; rises in Pico D'Urbion in Soria, Spain; flows generally W., and falls into Atlantic at Oporto; navigable to distance of 90 miles from mouth; length, *c.* 485 miles; crossed by Wellington, after desperate contest, 1809.

DOUROUCOLIS, OWL-FACED MONKEYS (*Nyctipithecus*), a genus of New World monkeys belonging to family Cebidæ (*q.v.* under *Primates*), with non-prehensile tails, nocturnal, vegetarian, and insectivorous; found in Venezuela, Brazil, Guiana, and Colombo.

DOUSA JANUS JAN VAN DER DOES (1545-1604), Lord of Noordwyck; Dutch scholar and politician; defended Leiden when besieged; curator of Leiden University.

DOVE (52° 50′ N., 1° 50′ W.), river, Derbyshire and Staffordshire, England; rises S.W. of Buxton; joins Trent at Newton Solney.

DOVE, a term including several members of the *Columbidoe*, being the stock-d., rock-d., ring-d., and the turtle-d.; all are typical perchers, with compact body and powerful wings; grain feeders, with beak characterized by presence of two bare protuberances at base; easily domesticated. In Christian art the d. symbolizes the Holy Ghost; also an emblem of purity or innocence, and, holding an olive branch, peace.

DOVER, a city of Delaware, in Kent co., of which it is the county seat. It is on the Philadelphia, Washington and Baltimore Railroad, 75 miles S. of Philadelphia. Dover is the center of a large fruit growing region. It is an attractive city and has important historic associations. It is the seat of Wilmington Conference Academy. A handsome monument erected to the memory of Caesar Rodney, one of the signers of the Declaration of Independence stands in the city. Among the chief buildings are the State house, courthouse, U.S. Government building. Its industries include packing establishments, flour mills, foundries, machine shops, carriage factories, etc. Pop. about 5,000.

DOVER, a city of New Hampshire, in Stratford co., of which it is the county seat. It is on the Boston and Maine Railroad and the Cocheco River, 168 miles N. of Boston. Dover is admirably situated on high ground and is attractively laid out. It has many handsome buildings and private residences. The river has a depth here of 11 feet, which gives good shipping accommodations. The falls within the city limits supply abundant water supply for its large industries which include cotton and woolen mills, printing works, boot and shoe factories, tanneries, brass and iron foundries, and machine shops. There are several private schools including St. Joseph's Hill School, and Franklin Academy. Dover is the oldest city in the State. It was settled in 1623 and in 1689 was nearly destroyed by Indians. It received its charter as a city in 1855. Pop. 1920, 13,029.

DOVER, a city of New Jersey, in Morris co. It is on the Lackawanna and the New Jersey Central railroads, and on Rockaway River and the Morris and Essex canal. It is an important industrial city and has railroad shops, machine shops, furnace and stove factories, and silk and hosiery mills. Several popular summer resorts are in the neighborhood. Pop. 1920, 9,817.

DOVER, a city of Ohio in Tuscarawas co. It was formerly known as Canal Dover. It is on the Baltimore and Ohio, the Pennsylvania, and other railroads. The city is important industrially, and contains a large plant of the United States Steel Corporation, and several coke and coal companies have their plants here. The manufacture of electrical devices is also important. Pop. 1920, 8,101.

DOVER, seapt. and munic. bor., S.E. coast of Kent, England (51° 8′ N., 1° 19′ E.), on the Strait of Dover; chief port for passenger and mail traffic with Continent, also port of call for Atlantic liners; has been a stronghold since early times; one of the Cinque Ports, with a long naval history; castle on the cliffs, remains of Roman *pharos*, church of St. Mary in Castra partly dating from Norman times. Defended by batteries concealed in the cliffs and by more modern works; Shakespeare's Cliff (350 ft.) on the W. is pierced by railway connecting Dover with Folkestone; at foot of cliff is entrance to proposed Channel Tunnel; great extension of harbor begun in 1847. In 1891 new commercial harbor begun, completed 1901; the Prince of Wales's Pier, parallel with Admiralty Pier, encloses 75 ac. of sheltered water; in 1909 a great artificial naval harbor, enclosing 690 ac., was completed; modern residential town; pop. wat.-pl. During World War was base of Dover Patrol; large military camps in vicinity; raided a dozen times by enemy aircraft, most serious visitation being on March 20, 1916; one of the raiders brought down off Belgian coast two days later. Pop. 43,600.

DOVER, ELMER (1873), assistant secretary of the Treasury, born at McConnelsville, Ohio, *s.* of John Wesley and Frances Winn Dover. He was educated in the public schools at McConnelsville. He was a newspaper reporter and editor until 1897 when he became secretary to late Senator M. A. Hanna with whom he remained until 1904 when he was made secretary of the Republican National Convention. In 1908 he became sec. of the National Advisory Com. and two years later vice-president and Pacific Coast manager of H. M. Byllesby Co. of Chicago, which position he retained until 1919 when he accepted the position of president of the Western Rubber Co., Tacoma, Wash. The following year he took charge of the presidential campaign of Warren G. Harding on the Pacific Coast and in 1921 was appointed by President Harding as assistant secretary of the Treasury, resigning in 1923.

DOVER PATROL, naval force established during the World War for protection of vital military lines of communication between England and France, its additional functions being (1) to guard and examine the traffic passing E. and W. through the Channel, and, later on, (2) to harass the right flank of the advancing German army; (3) to prevent landings by the enemy on the Belgian and Fr. coasts; (4) to cope with enemy submarines and destroyers as they issued from Ostend to Zeebrugge, and to prevent them from passing through Dover Strait; and (5) to inflict damage by bombardment and otherwise on the heavy gun batteries, lock-gates, and other naval and military works, when these came into existence after the Ger. occupation of Belgium. At first the patrol consisted of three scouts, twelve tribal class destroyers, and twelve little fifteen-year-old destroyers, with three or four small submarines. The monitors *Mersey, Severn,* and *Humber* were subsequently added, also the obsolete battleships *Revenge* and *Venerable.* With this motley squadron Rear-admiral Hood checked considerably the enemy's advance near the shore, until the Belgians flooded the lands surrounding Nieuport. In the spring of 1915 Rear-admiral Bacon was appointed to the command, and the patrol grew until it included twenty-four distinct types of fighting ships, none, however, of the first class. Bacon devised and established successive anti-submarine barrages: the first between Folkestone and Cape Grisnez proved unsuccessful; the second, between the Goodwin Sands and the Fr. coast, consisted of moored nets, with mines attached, held in a frame of flexible wire rope; mines were laid close to the sea bottom to guard that portion not covered by the net. The final obstruction was an immense minefield laid between Folkestone and Grisnez in the winter of 1917-18. All the anti-submarine barrages were guarded by destroyers and auxiliary patrol vessels, and were illuminated by 'Dover flares' at night, so that, except in foggy weather, no submarine could pass through the Channel on the surface or awash without being sighted and hunted. It is considered that this final barrage effectually barred the passage to enemy submarines through the Strait of Dover. Coastal attacks were conducted by monitors against Zeebrugge and Ostend during the summer and autumn of 1915, but the monitors were outranged, and the operations were abandoned. Late in 1915 monitors with 15-in. guns joined the command, and gun positions in Flanders were constantly and successfully attacked. Skirmishes between the Ger. and the Brit. naval forces were frequent, but no determined attacks were made on the coast-watching vessels. Heavy naval ordnance was landed for counter-battery work against the mighty Ger. weapons used for bombarding Dunkirk, Adinkerke, and other places. A few destroyer raids were made by the enemy; on the night of Oct. 26, 1916, six drifters and the twenty-year-old destroyer *Flirt* were sunk; on April 21, 1917, the famous encounter of *Broke* and *Swift* with six enemy destroyers took place. After this reverse enemy craft did not enter Dover Strait for almost a year. At the end of 1917 Admiral Bacon was relieved by Rear-admiral Roger Keyes, who conducted the operations for blocking ZEEBRUGGE and OSTEND. The Dover destroyer flotilla covered the small craft which made a smoke screen during the operations, and the Dover monitors, coastal motor boats, etc., were employed in support. During 1918 more coastal operations were carried out, and in these, monitors armed with 18-in. guns were employed.

DOVER, STRAIT OF (Fr. *Pas de Calais*), channel connecting North Sea with Eng. Channel, extending from Dungeness and Cape Grisnez to S. Foreland and Calais, 22 m.; breadth between Dover and Calais, *c.* 22 m.; swum by Captain Webb, Aug. 24-5, 1875 and by T. W. Burgess, Sept. 6, 1911; first crossed by aeroplane (Blériot) July 25, 1909. P. and O. liner *Maloja* mined off Dover with great loss of life, Feb. 27, 1915; Brit. hospital ship *Anglia* mined, Nov. 17, 1915; channel steamer *Sussex* torpedoed, March 20, 1916. Cross-channel steamers enjoyed wonderful immunity from attack, thanks largely to Dover Patrol.

DOVER'S POWDER, a prescription of Dr. Dover, 1660-1742. It is regarded as a medicine of great value, and acts as a sudorific. The ingredients are: one part each of powdered opium and powdered ipecacuanha root, together with eight parts of sulphate of potash. From five to ten grains constitutes an ordinary dose.

DOW, ARTHUR WESLEY, artist, *b.* Ipswich, Mass. He studied art in Boston and Paris, exhibiting at the Salon of the latter city, between 1886 and 1889, and was awarded a medal at the Buffalo Exposition. He taught art in Boston, New York and Ipswich. In 1904 he was appointed professor of fine arts at the Teachers' College, Columbia University. He became a member of a number of art societies and wrote on art composition and color prints. He died in 1923.

DOW, GERHARD (1613-80), Dutch artist; pupil of Rembrandt; painted portraits and still life.

DOW, LORENZO (1777-1834), Amer. Methodist preacher.

DOW, NEAL (1804-97), temperance reformer, *b.* Portland, Maine. He received a Quaker education, became mayor of his home town, and served in the State legislature, where he acquired prominence as the father of the Maine prohibition law of 1851, which forbade the manufacture and sale of intoxicating liquors. As a temperance advocate he traveled the country over on speaking tours, and also urged liquor restrictions in Canada and Great Britain. He took a distinctive part in the Civil War as commander of a regiment of Maine volunteers, and as a brigadier-general in charge of the fortifications at the mouth of the Mississippi and of the Department of Florida. In 1863 he was captured by the Confederates in an action at Port Hudson and held a prisoner for eight months. In 1880 he was Prohibition candidate for President.

DOWAGER, title given to widow to distinguish her from her son's wife; applied to ladies of rank.

DOWAGIAC, a city of Michigan, in Cass co. It is on the Michigan Central Railroad, and is the center of an important agricultural region. Its industries include flour and lumber mills, a canning factory, and a gas factory. It also has plants for the making of stoves, gloves, furniture, etc. Pop. 1920, 5,440.

DOWDEN, EDWARD (1843-1913), scholar and man of letters, prof. of Eng. literature at Trinity Coll., Dublin; wrote *Shakespeare, his Mind and Art*, (1875,) and numerous other works of high literary quality and revealing criticism. His edition of *Shelley*, 1890, is specially noteworthy.

DOWELL, SPRIGHT (1878), an American college president, *b.* at Cary, Wake co., N.C., *s.* of George James and Trannia Yates Dowell. He was educated at Wake Forest College, N.C., the University of Tennessee and at Columbia. He became principal of elementary school, Shelby, Ala. in 1898 and from 1900 to 1906 was principal of the high school at Columbiana. In 1908 he became supt. of schools at East Lake, 1909 principal of Barrett School at Birmingham, 1913 chief clerk of the Department of Education of Alabama and in 1915 director of Teacher Training and conductor of institutes of the Department of Education. He was later state superintendent of education and was appointed president of Alabama Poly. Institute in 1920.

DOWER, widow's interest in real estate of deceased husband.

DOWIE, JOHN ALEXANDER (1847-1907), born in Edinburgh, was for a time a student at Edinburgh University. He afterwards went to S. Australia, where his parents were living, as the minister of a Congregational church. Later on he claimed the power of being able to heal people by means of prayer, and organized the 'Christian Catholic Church in Zion,' he himself being the overseer, and at the beginning of 1900 he settled with his followers on the shores of Lake Michigan in Zion City. In 1903 and 1904 he visited England, where he did not meet with much encouragement, and in 1906 his prestige over his followers was lost after the revolt of Zion City. D. was popularly known by the title of 'Doctor,' and he himself claimed to be Elijah.

DOWIE, MÉNIE MURIEL (1867), Brit. novelist and traveler. Her novels include *A Girl in the Karpathians*, 1891; *Gallia*, 1895; *Some Whims of Fate*, 1896; *Love and his Mask*, 1901.

DOWN (Fr. *dune*, a hill), undulating tract of land, covered with short grass, suited for pasture.

DOWN (54° 20′ N., 6° W.), county, Ulster, Ireland; bounded N. by Antrim, W. by Armagh, S. by Carlingford Lough, E. by Irish Sea. Stock-raising and dairy-farming are carried on. Chief rivers are Lagan and Bann; principal towns are Downpatrick (county town), Newtonards, Banbridge. Pop. 304,589.

DOWNING, SIR GEORGE (*c.* 1624-84), a preacher in West Indies; then soldier under Cromwell; resident at The Hague, 1657; turned Royalist and was knighted at Restoration; cr. bart. 1663; Sec. to Treasury, 1667. (D. Street bears his name.)

DOWNPATRICK (54° 20′ N., 5° 43′ W.), market town, capital of County Down, Ireland; cathedral supposed to contain remains of St. Patrick; linen.

DOWNS (50° 54′ to 51° 17′ N., 2° 32′ W. to 0° 20′ E.), two ranges of chalk hills, S.E. England. North Downs extend E. to W. from Hampshire through Surrey and Kent to Dover. South Downs, in Hampshire and Sussex, terminate at Beachy Head.

DOWNS (51° 15′ N., 1° 28′ E.), name of a channel, E. coast of Kent, between N. and S. Foreland; forms roadstead, protected by Goodwin Sands; indecisive battle between English and Dutch fleets, 1666.

DOWRY, the property which a wife brings to her husband at marriage.

DOXOLOGY (Gk. *Glory to God*), form of praise to the Deity in use in Christian Church; based on certain Scripture passages, e. g. *Isaiah* 6^{3}, *Matthew* 6^{13}. The *Greater D.* appears in Prayer Book in Communion Service; *Lesser D.* (based on *Matthew* 28^{19}) is sung at end of each psalm.

DOYEN, CHARLES A. (1859-1918), brigadier-general; *b.* New Hampshire; *d.* Quantico, Va. He became a second lieutenant of the Marine Corps after graduating from Annapolis in 1883. He saw service in the Spanish-American war and in the Philippines, where, in 1905, he became commander of the first brigade of marines in the islands. He also commanded the first regiment of marines sent to France in 1917 and was an authority on machine-gun warfare.

DOYLE, SIR ARTHUR CONAN (1859), Eng. novelist; studied medicine at Edinburgh under Joseph Bell, from whom he drew character of his omniscient detective, Sherlock Holmes. Produced *A Study in Scarlet*, 1887; *Micah Clarke*, 1888; *The Sign of Four*, 1889, and *The White Company*, 1890, while in medical practice; leaped into fame with *The Adventures of Sherlock Holmes*, 1891, which was followed by *The Memoirs of Sherlock Holmes*, 1893, and in 1905 by *The Return of Sherlock Holmes*. Other novels include *Rodney Stone*, 1896; *Hound of the Baskervilles*, 1902; *Adventures of Brigadier Gerard*, 1903; *Sir Nigel*, 1906; *Through the Magic Door*, 1908; *The Last Galley*, 1911; *The Lost World*, 1912; *The Poison Belt*, 1913; *The Valley of Fear*, 1915. His *Great Boer War*, 1900, became a standard work, and his *Story of Waterloo* was one of Sir

Henry Irving's successes. During the World War and subsequently he produced his *History of the British Campaign in France and Flanders*; was an active propagandist of spiritualism; knighted in 1902.

DOYLE, SIR FRANCIS HASTINGS, Bart. (1810-88), Eng. poet; won much popularity with his military and heroic ballads.

DOYLE, RICHARD (1828-83), Eng. black-and-white artist; *s.* of John Doyle, 1797-1868, the caricaturist, 'H.B.'; on staff of *Punch*; illustrated Dickens and Thackeray.

DOZSA, GYORGY (*d.* 1514), Hungarian revolutionist; drilled a rabble with intention of marching against the Turk; the landlords objected, and D.'s army turned against them. After prolonged rebellion D. was executed with revolting cruelty.

DRACHENFELS, a mountain peak in Germany belonging to the Siebengeberge range. It is situated on the right or eastern bank of the Rhine, 10 m. S.E. of Bonn, and close to Konigswinter. Rising to a height of 1055 ft. it is noted as being the steepest mountain of the whole group. The Drachenhohle, or the dragon's cave, is in the slopes, around which is woven the story of the dragon that was slain by Siegfried. The peak is ascended by a mountain railway.

DRACHMA was, in ancient Greece, a silver coin, equal in value to one-hundredth part of a mina and a six-hundredth part of a talent. Until Solon's day a D. was worth a little over a shilling, but the Attic D. was equivalent to about 9¾*d.* in English currency. The obol was equal to one-sixth of a D. In Athens the principal coin in use was the tetra-drachmon, worth four drachmæ, having the head of Pallas engraved on one side, and the owl on the other. As a weight measure, 100 drachmæ were again equal to 1 mina (almost a lb.). The Greek D. in modern currency, supposed to be of the same value as a French franc, is really worth about 8½*d.* It is divided into 100 lepta.

DRACHMANN, HOLGER HENRIK (1846-1908), Dan. poet and dramatist; wrote poems of fisher life, and love lyrics; and several successful plays: *Once upon a Time*, *Wayland the Smith*, etc.

DRACO (VII. cent. B.C.), Athenian archon, famous as lawgiver; tradition attributes to his laws the utmost severity, hence our adjective *Draconian*. Aristotle ascribes to him the remodelling of the *Constitution of Athens*, but modern scholars believe the Constitution to be of later date. D.'s code was cancelled by Solon.

DRAFT, SELECTIVE. See ARMY, UNITED STATES.

DRAFTED MASONRY, in arch., stones with trimmed border, the center being left rough.

DRAGO DOCTRINE, the principle that force may not be used by one power to collect money owing to its citizens by another power. It appears to have originated in 1902, when Britain, Germany and Italy blockaded the ports of Venezuela for that purpose, Dr. L. F. Drago, a well-known Argentine jurist, maintaining that their action was contrary to international law. Most of the S. American republics supported the doctrine, which has ever since been known as the D.D.

DRAGOMAN (from Arab.), name used in Eastern countries for interpreter.

DRAGOMIROV, MICHAEL IVANOVICH (1830-1905), Russ. general and author.

DRAGON, fabulous monster, with griffin's head, scaly, winged body, huge claws, and barbed tail, and so represented in heraldry; common to ancient mythology, and frequently mentioned in mediæval poetry; saints and heroes were d. killers, (*e.g.*) Buddha, Thor, Zeus, Œdipus, Perseus, St. George, Beowulf. In Chin. and Jap. art the d. is common.

DRAGON-FLY, ODONATA, are a group of highly developed insects possessing a long body, and a head bearing two large eyes, which rotate freely through a large angle owing to the small base of attachment. There are two pairs of wings of clear, membranous character. The insect's whole structure indicates specialization for powerful flight. The food consists of smaller insects, captured on the wing. The nature of their food requirements makes d's inhabit reed-fringed areas of water, hedgerows, and the neighborhood of wooded land.

DRAGOON, original name for a mounted soldier, who fought on foot, and was armed with a firearm called a 'dragon.'

DRAGUIGNAN (43° 32′ N., 6° 28′ E.), chief town, Var, France; olives, silk-culture. Pop. 10,000.

DRAINAGE implies the drawing off of superfluous or standing water by means of channels, surface or underground. *Surface d.*, in which the land is ploughed into ridges, with furrows between them into which the water runs and is then carried into ditches, is unsatisfactory, and is now generally superseded by underground *pipe* d. D. systems must be adapted to the land, the main drain lying in the lowest natural depressions and the parallel drains running into it along the lines of greatest slope. In flat land a fall is obtained by increasing the depth of the lower ends of the drains. The fall should be not less than 1 in 200. The main drain should be kept clear of trees and hedges, and its outlets protected by gratings. D. in agriculture has only been practiced in the United States during recent years. Before 1890 there was such an abundance of land available that it did not pay to devote labor to the preparation of marshy lands for agricultural purposes. In Great Britain it was practiced several centuries ago. Two systems of drainage are practiced: open and closed. The first is the most common and least expensive, and consists in digging open ditches, running from the higher portions of the land to be drained to the lowest point, such ditches being from 12 to 16 inches deep and 18 inches wide. This method is crude and entails constant labor in keeping the ditches clear. Covered drainage may again be divided into two kinds, the first of these being also of a temporary nature. This consists of 'mole drains,' in which the channels for the flow of surplus water are made with a special implement, known as the 'mole plow.' This is a wrought-iron tool resting on four wheels, having a coulter with a pointed sock, which may be raised or lowered in the frame according to the depth of the drain. This is followed by the 'mole,' an oval piece of iron, 3½ inches in diameter, attached to the coulter by a short chain. The implement can, of course, only be used in soft clay. It is hauled from one end of the swampy ground to the other by means of a wire cable, wound around a windlass or capstan on higher ground, being hauled back again by a team of horses. The most permanent systems of d. consist of tile or concrete pipes, preferably the first, such as ordinary sewer pipes. These pipes are laid at least 2½ feet deep, and must have a fall of at least one foot every 200 feet of length. The ends must be covered with wire netting to prevent the entrance of rats or other animals which, in constructing nests, are likely to block the flow. In clay soil tile drains will draw water from a distance about five or six times their depth below the surface; in a medium soil from seven to nine times their depth, and in light soil from eight to ten times their depth. A tiled d. system is comparatively expensive, and not only is great care needed in obtaining the maximum amount of service from the least amount of piping, but it must also be ascertained beforehand that the land is subject to drainage. At some point at its outer circumference there must not only be a fall sufficiently low to give the required flow of water, but there must be a further drop in the direction of some flowing body of water, into which the surplus water may empty. In larger operations the services of competent surveyors are, of course, necessary, but in minor undertakings the level of the ground to be drained may be surveyed by an amateur. The most serviceable instrument can be made of a short piece of pipe, half filled with water and covered with some semi-transparent material at either end, capable of holding the water within the pipe. The pipe may then be leveled on an upright, and will be perfectly level when the water at either end covers an equal part of the circumference of the opening. By sighting along the pipe, stakes may be driven in around the edges of the swampy land and the most depressed points indicated, including the point to which the drains should be conducted.

DRAKE, ADMIRAL SIR FRANCIS (*c.* 1545-95), Eng. seaman; *b.* Devonshire; took part in expeditions to Spanish Main under Hawkins; distinguished himself at San Juan de Ulloa; did great damage to Span. trade and shipping in S. America, 1572-73; first Englishman to sail round the world, 1577-80; burned shipping in Cadiz harbor, 1587; helped to defeat Armada, 1588; died at sea off Nombre de Dios.

DRAKE, JOSEPH RODMAN (1795-1820), poet, *b.* New York City. He was early left an orphan, and his youth was passed in poverty, but he succeeded in learning medicine, receiving his degree in 1816. That year his circumstances were much improved by his marriage to the daughter of a wealthy shipbuilder, Henry Eckford. He died of consumption in New York at the age of 25. In his brief literary career he wrote humorous and satiric poems for the New York Evening Post, in association with Fitz-Greene Halleck. His most notable writings were *The American Flag*, a popular patriotic song of the day, and *The Culprit Fay*, a fanciful work having the Hudson river for its theme by way of showing that American rivers could not inspire romance and poetry through lack of old-world atmosphere.

DRAKE, SAMUEL ADAMS (1833-1905), editor and author, *b.* Boston, Mass. As a young man he went to Kansas, entered journalism, became a correspondent of St. Louis and Louisville papers and edited the Leavenworth *Times*. He joined the Union forces in the Civil War, serving as inspector, adjutant general and brigadier general of the Kansas militia. After the war he settled in Boston as an author and produced a considerable number of popular works. His subjects included myths and folklore, England, the West, the Ohio Valley States and the Revolution.

DRAKE UNIVERSITY, a co-educational institution of higher learning, situated in Des Moines, Iowa. It was founded in 1891 by the Disciples of Christ and named in honor of General Francis Marion Drake, who donated $230,000 to its endowment. The university's curriculum includes instruction in the liberal arts, law, the Bible, medicine, music, oratory, pharmacy, business training, and kindergarten tuition. In 1922 the institution, under the presidency of A. Holmes, Ph.D., had a student roll of 2291, and 80 teachers.

DRAKENBORCH, ARNOLD (1684-1748), Dutch scholar; famed for edit. of Livy.

DRAKENSBERG (25° S., 30° 30′ E.), mountain chain, S.E. Africa; extends from Great Fish River to Olifant's River; culminates in Mont Aux Sources, Giant's Castle, and Champagne Castle (10,000 to 11,000 ft.); numerous passes; De Beers and Van Reenen's Passes (over 5000 ft.) are crossed by railways connecting Orange Free State and Natal.

DRAMA. Dramatic art in Europe and America had its source in the anc. Hellenic culture, which, more than two thousand years ago, reached its full development in Periclean Athens.

Greek Drama.—Attic tragedy grew out of the annual dithyrambic hymns and dances associated with the worship of Dionysus (Bacchus). Thespis is regarded as the inventor of tragedy, because he introduced the practice of the 'rhapsode,' or minstrel, addressing himself to the chorus, thus making him an actor. Amongst the earliest writers of Gr. tragedy were Phrynichus, 512-476 B.C., Chœrilus, 524-465, and Pratinas, 500-460; but it first achieved greatness in the hands of Æschylus, 525-456, who introduced a second actor to the Gr. stage. He was, in turn, superseded in the estimation of the public by Sophocles, 496-405, who added a third actor, while one of his plays, *Oedipus at Colonus*, required a fourth actor. The classic period of Attic tragedy ended its course in the dramatic work of Euripides, 481-406. Briefly it may be said of these three writers that the great work of Æschylus was only surpassed by Sophocles in a somewhat stronger dramatic interest, while the plays of Euripides represent Gr. tragic art in the period of its decline. The plays of Euripides also supplied the model for the Roman tragic dramatists who came after.

Gr. comedy—comedy meaning 'village-song'—belongs to the same period as tragedy, and sprang likewise from the worship of Dionysus. Some of the earliest writers of comedy were Epicharmus, Chionides, Cratinus, Crates, and Eupolis. Attic 'Old' comedy, however, reached its highest quality in the work of Aristophanes, a contemporary of Euripides. For about forty years this great comic poet continued to lash his contemporaries with the whip of his keen satire. His work was succeeded by that of Alexis, Eubulus, and Antiphanes —the period being known as that of the 'Middle Comedy,' which subsequently gave place to the 'New Comedy,' the chief exponents of which were Philemon and Menander.

Latin Drama.—The Latins at an early period in their history developed a species of popular farcical play, the most distinct types of which were known as *Saturnoe* and *Mimi*; but the drama proper was of Gr. origin, and came into existence in Rome when Livius Andronicus, a native of Tarentum, produced, 240 B.C., both a tragedy and a comedy in celebration of the victorious close of the first Punic War. The earliest Lat. tragedies that remain were the work of the philosopher and rhetorician Lucius Annæus Seneca, 4 B.C.-A.D. 65, who was also the tutor of the Emperor Nero. The Roman tragic period appears to have flickered out during the reign of Domitian. The author to give genuine distinction to comedy was Plautus, 254-184 B.C., who was succeeded by Terence, 185-159 B.C.

American.—The first Amer. play to be produced was *The Contrast*, New York, 1786, by Royall Tyler; but the first drama of any importance was John Howard Payne's tragedy, *Brutus, or the Fall of Tarquin.* Translations, adaptations, and imitations of Fr. drama formed the bulk of stage plays during the greater part of 19th cent., though Denman Thompson's *Old Homestead* and plays of the sort depended wholly on national and local conditions, which they portrayed with remarkable fidelity. The farces of Charles H. Hoyt and scenes from low life by Edward Harrigan, though faulty in construction, were also native and independent. *Shore Acres*, 1892, a New England drama by James A. Herne, followed but easily surpassed in art the *Old Homestead*; and Herne's later play, *Griffith Davenport*, 1898, was finer still—though all his plays dealt with the more obvious and plainer sides of human nature. Augustus M. Thomas, *Alabama*, *The Witching Hour*; Clyde Fitch, *The Climbers*, 1900; *The Girl with the Green Eyes*, 1902; William Vaughan Moody, *The Great Divide*, 1907; Eugene Walter, *The Easiest Way*, 1909; Edward Sheldon, *Salvation Nell* and *Romance*; Percy Mackaye, *Jeanne d'Arc*, 1906; David Belasco, William Gillette, Charles Klein, and notably Bronson Howard, 1842-1908, are dramatists of ability.

Among the younger American dramatists who have produced plays of originality and power are Eugene G. O'Neill, whose best work includes *Anna Christie*, *Emperor Jones*, and *The Hairy Ape*. Zoe Akins has also written plays of distinctive merit. Gilbert Emery, whose play *The Hero* had unusual merit, also showed promise of unusual talent. Other American playwrights whose plays are in a lighter vein are Arthur Richman, Harry W. Gribble, George S. Kaufman, Don Marquis, Marc Connelly, William Anthony McGuire and Booth Tarkington. Rachel Crothers has written plays which show a keen perception of social values. Avery Hopwood has produced several farces, and Harvey O. Higgins, Harriet Ford and Fannie Hurst have succeeded in producing popular plays.

English Drama.—The decline of the drama was completed by the rise of the Christian Church, which, from the 6th to the 11th cent., remained persistently hostile to the stage, and prohibited all kinds of theatrical entertainments. Yet it is a curious fact that, though the Church suppressed the drama, it was subsequently the direct instrument of its revival. This was by means of *Miracle* and *Mystery* plays—dealing with Scripture history and legends of the saints—which were performed by ecclesiastics themselves in the churches throughout Europe. Miracle plays were first performed in London during the 12th cent. They reached their highest point of success when they were taken in hand by the civic trading companies of the great towns, of which Chester, 1268-76 was apparently the first, though other towns followed the custom during the 13th and 14th centuries. Four collections of these plays—the Chester, York, Townley (Wakefield), and Coventry—still survive. Miracle and mystery plays were succeeded by *Morality* plays, which were entirely allegorical and dealt with the conflict between good and evil, but introduced some comic relief. These were succeeded by the humorous *interludes* of John Heywood, *c.* 1500-77. *Pageants* and *masques* also belong to this period. The first Eng. comedy was *Ralph Roister Doister*, by Nicholas Udall, 1505-56; and another early work of the kind was *Gammer Gurton's Needle*, printed in 1575, and sometimes attributed to Dr. Still. The earliest Eng. tragedy was *Gorboduc*, by Norton and Sackville, first acted by members of the Inner Temple before Queen Elizabeth, 1562. To these succeeded a long series of *Chronicle* plays founded on Eng. history or derived from foreign sources, of which the chief exponents were Lyly, Kyd, Peele, Greene—and, by far the greatest of all, Christopher Marlowe. Shakespeare, who succeeded to these bombastic playwrights, derived many of his plots from these earlier plays. Shakespeare, Jonson, Beaumont and Fletcher, Webster, Massinger, Tourneur, Middleton, Ford, Dekker, and other master dramatists belonging to the Elizabethan and Jacobean period, are dealt with individually elsewhere. Then followed a period of eclipse and silence. The Puritans closed the theatres, and the drama did not again raise its head until the restoration of Charles II., 1660.

The connecting link between the Elizabethan dramatic period and the stage of the Restoration was James Shirley, 1596-1666. The next considerable figure in the history of the English drama is Dryden, whose work belongs to the period following the Restoration. Thomas Otway, 1652-85, in *Venice Preserved* maintained some of the spirit of the Elizabethans in tragedy. With Congreve, Wycherley, Etherege, Farquhar, and Vanbrugh, in whom the Fr. influence was paramount, Eng. comedy reached at once a higher and a lower level than it has ever reached again. Though marked by the licentiousness of the age, it is distinguished for its witty and polished dialogue. Amidst much that was worthless and trivial, the closing years of the 18th cent. were marked by a period of dramatic splendor due to the works of Oliver Goldsmith, 1728-74, and Richard Brinsley Sheridan, 1751-1816.

The English drama of the first part of the 19th cent. was largely of a machine-made order. James Sheridan Knowles, 1784-1862, enjoyed considerable vogue with his *Virginius* and *The Hunchback*. Lord Lytton's *Richelieu*, *Money*, and *The Lady of Lyons* now appear somewhat stilted and old-fashioned. Shelley's *The Cenci*, in the opinion of some critics, is the finest poetic play written since the time of the Elizabethans. Tom Taylor, 1817-80 was a prolific dramatist, and obtained considerable success during a transition period with *Still Waters Run Deep* and a series of historical plays. Of similar type was the dramatic work of W. G. Wills, 1828-91, three of whose plays, *Charles I.*, *Eugene Aram*, and *Olivia*, were amongst the most successful plays produced by Irving. Dion Boucicault, 1820-90, made his first success with *London Assurance*, but achieved a greater and more lasting popularity with his Irish plays, *The Colleen Bawn*, *The Shaughraun*, and *Arrah-na-Pogue*. To this period also belongs the work of Henry James Byron, 1834-84, whose play, *Our Boys*, had a consecutive run of three years.

The turning-point in the recent history of the Eng. drama began with the comedies of T. W. Robertson, 1829-71. The Bancrofts produced Robertson's *Society*, *School*, *Ours*, and *Caste*. Immediately following the conclusion of the Bancrofts' triumphs was the entry of Sir Henry Irving, 1871, who gave new dignity to the Shakespearean and romantic drama, and set a higher standard of production.

A new era in stage history was begun with the production of Sir A. W. Pinero's *Money Spinner*, 1881, which, being followed by such brilliant farces from the same pen as *The Magistrate*, *Dandy Dick*, and *Sweet Lavendar*, served to give their author a high place in modern dramatic literature. The last-named play was staged in 1888, and the following year witnessed the first presentation of Ibsen's *A Doll's House* and *Pillars of Society*, followed during the next two or three years by *Rosmersholm*, *Hedda Gabler*, and *The Master Builder*. Forsaking farce, Pinero made a bid for popularity with *The Profligate* 1889, a *The Second Mrs. Tanqueray*, 1893; *The Notorious Mrs. Ebbsmith*, *The Gay Lord Quex*, *His House in Order*, etc. Henry Arthur Jones, who began as a writer of melodrama, of which *The Silver King* is an example, proceeded later to work of a higher literary character, such as *The Middleman* and *The Dancing Girl*; and subsequently, with such brilliant work as *The Masqueraders* and *The Case of Rebellious Susan*. Sydney Grundy was for long a successful purveyor of stage fare, one of his best efforts being *A Pair of Spectacles*, produced by Sir John Hare. Of the younger writers belonging to this period much excellent and varied work was given to the stage by Haddon Chambers, R. C. Carton, H. V. Esmond, Robert Marshall, and Basil Hood. The plays of Oscar Wilde, beginning with *Lady Windermere's Fan*, 1892, and ending with *The Importance of Being in Earnest*, 1895, are marked by a distinctly individual style, and won public favor by their brilliant flow of epigram. A passing reference can only be made to the revolution caused in light opera by the delightful series of comic operas produced by Sir Arthur Sullivan and Sir W. S. Gilbert, which began with *The Sorcerer*, 1877, the popularity of all of which still continues. The plays of Sir J. M. Barrie, including *Quality Street*, *The Admirable Crichton*, *Peter Pan*, *What Every Woman Knows*, *A Kiss for Cinderella*, and *Dear Brutus*, all distinguished by a kindly humor, are amongst the most delightful productions of the modern theatre.

From about the beginning of the 20th cent. there have appeared plays attacking social problems and abuses in a fearless manner, and for these there has latterly been a growing appreciation. We may perhaps regard Mr. George Bernard Shaw as the pioneer of this type of play. In *Waste*, and in other of his plays, Mr. Granville Barker relentlessly probes modern social problems; and John Galsworthy, in *Strife* and in *The Silver Box*, deals with similar themes. John Masefield, in *Nan*, has contributed to the stage perhaps the greatest tragedy of modern times. Amongst other writers of excellent literary quality have been Mr. St. John Hankin, Mr. Arnold Bennett, and Mr. Charles M'Evoy. Within the space of one month in the spring of 1920 three plays of outstanding merit were produced *viz.*, Sir James Barrie's *Mary Rose*, Harwood's *Grain of Mustard Seed*, and Galsworthy's *The Skin Game*.

Poetical drama has not thriven of late. Stephen Phillips had considerable success with *Herod*, 1900; *Ulysses*, 1902, and *Paolo and Francesca*, 1902. *Pelleas et Melisande*, 1900, by the Belgian dramatist Maeterlinck, was a notable production; and his prose fairy tale, *The Blue Bird*, 1909, achieved great success. The classic Eng. drama—that is to say, Shakespeare—continued to be produced in the Irving manner by Sir Forbes Robertson, whose *Hamlet*, 1897, was a particularly beautiful performance, Sir George Alexander, Mr. Oscar Asche, Mr. Herbert Trench, and notably by Sir Herbert Tree, who carried elaboration to excess and made a Shakespearean play more of a gorgeous pageant than a drama. Latterly there has been a movement towards simplicity of production of a symbolic character. During the Great War the Brit. theatre was largely given over to farce, musical or otherwise.

The development of drama in Europe from the period of its decline under the Roman Empire, may now be briefly reviewed. The revival began in Italy in the 13th cent., but did not become remarkable before the 16th cent., to which period belongs the work of Trissino, Rucellai, Guarini, Tasso, Asinari, and Torelli. To these succeeded Granelli, Bettinelli, and Metastasio, writers of high merit, who led on to the work of the supreme master of Italian tragedy, Count Alfieri, 1749-1803. Italian comedy is represented by the work of Ariosto, Goldoni, and Gozzi, and numerous smaller writers since. Manzoni in 19th, D'Annunzio in 20th cent., imparted individuality to Italian drama.

Spanish drama was supreme in Europe at one period. Its Augustan age, when national drama flourished, began with the plays of Cervantes, 1547-1616, and was continued by the masterly works of Lope de Vega and Calderon; after which followed a long period of silence, to be broken by the powerful dramas of Echegaray in the late 19th cent.

In *France* the first great dramatic revival began with the associates of Ronsard, who constituted the 'Pléiade,' a leading member of which was Étienne Jodelle, 1532-73, author of *Cleopatre*, *Didon*, and *Eugene*. The class. drama found its great exponent in Corneille, 1606-84, and the movement was developed and enriched by the plays of Racine and Voltaire. Moliére, 1622-73 proved himself to be one of the greatest humorists the world has produced; and the brilliant light comedies of Marivaux, 1688-1763, belong to the glories of the Fr. stage. Reference must also be made to the comedies of Beaumarchais and de Musset, the domestic drama of Diderot, the romantic plays of Hugo, and the varied and excellent dramatic work produced by Scribe, Sardou, Augier, Dumas *fils*, Richepin, Rostand, Coppée, Bernstein, and the realistic Brieux. The Belgian Maeterlinck may also be mentioned.

In *Germany* the dramatic movement was slower, and from the period of the Miracle plays down to comparatively modern times there is little to be recorded save the work of the Nuremberg shoemaker, Hans Sachs, 1494-1576, who, by virtue of his numerous homely tragedies and comedies, has been described as the father of the Ger. popular drama. Eng. theatrical companies visited Germany during the 16th and 17th cents., but there was practically no native development until the rise to fame of Lessing, 1729-81, who with *Minna von Barnhelm*—regarded as the first German comedy worthy of the name—and his serious plays, *Emilia Galotti* and *Nathan the Wise*, first gave a dramatic literature to Germany. His lead was followed and developed by the great dramas of Goethe, the historical plays of Schiller, and the numerous exponents of the *Sturm und Drang* school. In recent times the best-known Ger. dramatists are Sundermann and Hauptmann, both members of the Naturalistic school.

The *Scandinavian drama* is distinguished by the fine work of the Dan. comic dramatist Baron Holberg, and by the realistic sociological plays of the Norwegians, Ibsen and Björnson, which like the dramatic works of the Swede Strindberg, belong to the 19th cent.

DRAMA LEAGUE OF AMERICA, an organization formed in 1910 to stimulate the production and success of good plays. It has local centers throughout the country. It establishes critical standards and has play-going committees who attend new productions and report through bulletins to their members on those deemed worthy. Reading circles, lectures and study classes feature the activities of the local branches, the aim being to develop the drama as the most democratic medium for popular self-expression and to build up audiences for plays which have earned the League's approval. In pursuit of its objects the organization initiated what became known as the Little Theatre movement by means of which community centers are formed and each establishes its Little Theatre, where plays of merit are produced not ordinarily seen in other playhouses. The League's propaganda work for good plays gradually spread all over the country and found a special response in small communities. The League's membership is about 10,000. Its official organ is the Drama League Monthly, and its chief centers are Washington, D.C. and Chicago.

DRAMMEN (59° 47′ N., 10° 18′ E.), seaport town, Norway; timber; sawmills. Pop. 1920, 26,174.

DRAPER, ANDREW SLOAN (1848-1913), educator, lawyer and author, *b.* Westford, N.Y. He received a primary school education at Albany. Afterwards he graduated from Albany Academy and served as a teacher for four years. Meantime he studied law and was admitted to the bar in 1871. He practiced law in Albany till 1887, entering the while into state politics and serving in the legislature where he devoted his energies to the needs of public education. President Arthur in 1884 appointed him one of the judges of the U. S. Court of Alabama claims. From 1886 to 1892 he was state superintendent of public instruction, and for two years afterward he headed the public schools of Cleveland, Ohio, a position he relinquished to become president of the University of Illinois. In 1904 he left the university to officiate as the first commissioner of education of New York State. His writings embraced many brochures on educational administration and he edited a series of volumes, *Self-Culture for Young People.*

DRAPER, JOHN WILLIAM (1811-1882), scientist and author, *b.* St. Helens, England. He came to the United States in his twenty-second year after studying at London University and obtaining private tuition in chemistry and kindred sciences, and entered as a student of the University of Pennsylvania, where he received the M.D. degree in 1836. His subsequent career was marked by the important professorships he held and by his inventions as a pioneer of modern photography, following the discoveries of Daguerre in 1839. After occupying the chair of chemistry, natural philosophy and physiology at Hampton-Sidney College in Virginia from 1836 to 1839, he became professor of chemistry and natural history at New York University, and later professor of chemistry and of physiology at the University Medical College. He also wrote a history of the Civil War and a volume of scientific memoirs. His History of the Intellectual Development of Europe, published in 1862, was translated into ten languages.

DRAUGHTS or **CHECKERS**, game played with checkers on a checkered board; supposed to be of very early invention; some such game was played by the ancient Egyptians and Greeks. The game is played between two persons, each having twelve 'men,' or pieces, those of one player being dark, the other light. It is played on a draught-board, divided into sixty-four spaces, alternately light and dark, the pieces being placed on one color only. Lots are cast for the choice of men and the object of the game is to clear off all the opponent's pieces.

DRAVE, DRAVA (45° 30′ N., 18° 45′ E.), river, Austria-Hungary; rises in Tyrol; flows generally E.; joins Danube 14 miles E. of Eszeb.

DRAVIDIAN, collective Sanskrit name for a very ancient, black-skinned tribal people, inhabiting Southern India, and their various languages. They were settled in India before the arrival of the Aryans, and now number about 58,000,000. They have about twelve languages, which include Tamil, Kanarese, Gondi, Telugu, Malayalam.

DRAWBRIDGE, in ancient times an invariable adjunct of a castle. It was a bridge hinged at one end and free at the other, so that it could be drawn up or let down as required. The original form was the lifting D., used to span the moat of a castle; this form is used now to provide a passage over canals, etc. The swing-bridge is a D. which revolves in a horizontal direction.

DRAWING, expression of form by means of pencil, pen, etc., is conventional, for a sketch of a pail shows an outline non-existent in the object. In pen-drawing merit depends on an artist's appealing to the imagination by using minimum of lines.

D. taught in schools includes d. and shading from still life—vases, flowers, etc.—in charcoal or B.B. pencil; *free-arm*, d. on blackboard with chalk; *designing* of panels, book-covers, etc., generally associated with color-work. Technical classes study *machine-d.*, *building construction*, etc., in which mathematical instruments are used. See ART.

DRAWING AND QUARTERING, treason penalty imposed in England from XIII. to XIX. cent. The culprit was first hanged, cut down alive, disemboweled, and his entrails burned; he was then beheaded and his body cut in four.

DRAYTON, MICHAEL (1563-1631), Eng. poet; wrote *Polyolbion*, 1613, a gazetteer of England in verse, *The Barons' Wars*, *England's Heroical Epistles*, *Nymphidia*; wrote 'Agincourt' poem and great sonnet, 'Since there's no help, come let us kiss and part.'

DREAMS, or conscious processes during sleep, are (like sleep itself) not well understood. The savage's theory is usually that during sleep the soul may leave the body or be visited by the souls of others, living or dead; and at a later stage d's are still considered prophetic. Telepathic communication is believed to occur comparatively frequently during sleep. Dreamless sleep is probably common; nor is the rapidity of d.-processes probably so great as is popularly supposed. Adults often forget their d's on waking, though a casual clue sometimes recalls them; children remember their d's more easily and are more liable to confuse d.-experiences with actual occurrences. D's are most commonly of objects of vision and hearing, though many kinds occur. A rare but important type is that in which the sleeper dreams that he has a d. Usually d's are distinguished as due to (1) central excitation, corresponding, (*e.g.*) to memories of interesting objects, and (2) stimulation from visceral and other processes in the body—(*e.g.*) the 'flying' d. has been attributed to the movements of breathing—and from temperature and other external stimuli. Freud's theory that d's are the expression of a latent wish has attracted much attention: he maintains that the apparently nonsensical sequences so common in d's are really elaborate symbolism corresponding to deep-rooted wishes of which the subject may be totally unaware.

DRED SCOTT CASE, a case of far-reaching importance on the slavery question decided by the Supreme Court of the United States, March 6, 1857. Dred Scott was a negro slave owned by Dr. Emerson an army surgeon stationed in Missouri. In 1834 the latter took Scott to Illinois where slavery was prohibited and in 1836 to Wisconsin Territory (now Minnesota) where it was also forbidden. Here Scott married one of his master's slaves. In 1838 he was taken back to Missouri and on the death of Dr. Emerson was hired out and badly treated. In 1848 Scott believing that through decisions of the Missouri courts he was a free man in a free state, brought suit against Mrs. Emerson for assault and battery. The St. Louis Circuit Court decided in his favor, but the Supreme Court reversed the decision. Mrs. Emerson now sold Scott to J. F. Sandford, N.Y. The negro in 1854 brought suit against Sanford for assault and battery in the Federal Court of Missouri and the case was carried to the Supreme Court of the United States in 1856. The verdict given in 1857 was to the effect that a slave had no rights, and could be taken by his owner anywhere. No negro could be a citizen of the United States; the Missouri Compromise (*q.v.*) was unconstitutional and neither Congress nor territorial government could protect slaves in territories. Chief Justice Taney said among other things that the slave had no rights a white man need respect; that the negro was a lower order of human being and could be lawfully reduced to slavery for his benefit. This decision caused great excitement throughout the country. In 1868 the 14th amendment declared the negro a citizen.

DREDGING, the excavation of material under water by mechanical devices. The operation dislodges and removes mud, silt, rock and other deposits from the beds of harbors, canals, rivers and docks. Out at sea the same process is utilized to scour the bottom and bring up oysters, shells, plants and other marine growths for scientific investigation. Modern engineering has developed very effective methods of dredging, notably in the sea-going dredge. There are a number of appliances used in dredging, from the single bucket or scoop of the dipper or grapple dredges, which alternately dig and lift the load, to the more elaborate types (ladder, hydraulic or suction and scowing dredges) which dig continually, raising the material at the same time.

The first named group are among the simpler forms of dredges. They include the 'bag-and-spoon' dredge, which has a leather bag attached to a metal hoop, both being fastened to a long pole, which guides their scraping of the bottom. Another device is the clam-shell dredge, so named because it has hinged iron jaws or scoops resembling a clam shell. This is the grapple type. The scoops spread open by means of chains as they descend, dig into the material at the bottom by the force of their own weight, and are then lifted up by a steam engine, and the contents deposited into a scow or barge alongside. The ladder bucket dredge is formed of a moving iron ladder attached at one end to a high superstructure raised on the deck of the dredging vessel, while the other end is lowered through a well in the vessel's center by means of a steam windlass and chains. Metal buckets are attached to the ladder, operating as an endless chain. As the ladder digs into the bottom the chain of buckets, operating at high speed, scoops up the dislodged material, and on returning loaded they discharge their contents into shoots, which empty it into scows. The hydraulic or suction dredge has a powerful pump operating on a flexible pipe, which is sent to the bottom and through it the material is pumped up and deposited into hopper barges moored alongside. This type of dredge removes much debris that is semi-liquid; hence the receiving hoppers have overflow pipes through which the water pumped up with the material is drawn off. It is serviceable in dredging sand, gravel, alluvial deposits and earth free from large stones, stumps, piling and similar obstructions. The dipper or bucket ledge is an application of the land steam shovel to under water excavation. It is extensively used in the United States and is the most familiar of all dredging devices. The bucket is suspended from a long support or arm and lowered to the bottom, where its teeth cuts into the material and, on being raised, deposits its load into a hopper or scow. The sea-going dredge embodies both the hydraulic principle of suction pump and pipe and the endless chain of buckets used in the ladder type.

DREISER, THEODORE (1871), novelist, and editor; *b.* Terra Haute, Indiana. After studying at Indiana University, he entered journalism in Chicago as a reporter, and afterwards became dramatic editor of the St. Louis *Republic*. As an editor he conducted *Every Month,* 1895-98; *Smith's Magazine,* 1905-6; *Broadway Magazine,* 1906-7; and the Butterick publications, 1907-10. Meantime he contributed articles and fiction to other periodicals and entered the ranks of the novelists and dramatists. His writings became of note for their unrelieved realism and were subjected to censorship. His best known novels are *Sister Carrie, The Financier, The Titan,* and *The Genius.* Following these he published plays and short stories. In 1922 appeared *A Book about Myself.*

DRENTE, DRENTHE (52° 50′ N., 6° 35′ E.), province of Holland; capital, Assen; bounded N. and N.E. by Groningen, E. by Prussia, S.E. by Hanover, S. and S.W. by Overyssel, W. by Friesland; area, 1030 sq. miles; flat, sandy fenland, overrun by canals for business of peat-digging; more fertile along banks of rivers; stock-rearing; few important centers or industries owing to land and isolated position. Pop. 1920, 208,718.

DRESDEN, cap., Saxony, Germany (51° 4′ N., 13° 41′ E.); beautifully situated on Elbe; Altstadt on l. bk., Neustadt on r. bk., connected by fine bridges; educational, sport, and tourist center; favorite pre-war residential resort for foreigners, especially Americans and English; within easy reach of beautiful Saxon Switzerland. Among finest buildings are royal palace with Green Vault (state treasury), Zwinger, a rococo edifice erected by Augustus the Strong, 1694-1733, as court of uncompleted palace, with royal picture gallery, containing Raphael's *Sistine Madonna* and other masterpieces, magnificent royal opera house, royal theatre, Johanneum, rich in Dresden porcelain, Albertinum, and other museums; Rathaus, Frauenkirche, Belvedere concert hall on Brühl Terrace, famous promenade along Elbe bank, and royal conservatory of music. Chief manufactures are pianos, sewing machines, leather wares, chemical products, scientific instruments, etc. Dresden was made cap. by Henry the Illustrious, 1270; seat of Albertine line of dukes, 1485; flourished in 18th cent. under Augustus I., the Strong, and Augustus II.; suffered severely during Seven Years' War; famous battle of Dresden, 1813, in which Napoleon defeated allies; Saxon republic proclaimed here after World War, Nov. 1919. Pop. 529,000.

DRESDEN CHINA. See CHINA.

DRESSER, HORATIO WILLIS (1866), author and lecturer, *b.* Yarmouth, Maine. In his youth (between 1879 and 1888) he was a telegraph operator and railroad agent in California and a stenographer, reporter, bookkeeper and proofreader in Boston. He graduated from Harvard in 1895 and taught philosophy there as an assistant from 1902 to 1911. Meantime he edited the Journal of Practical Metaphysics, and the Higher Law, and was an instructor in church history and practical philosophy at the New Church Theological School, Cambridge, Mass. His writings deal mainly with philosophical and spiritual themes.

DREUX (48° 44′ N., 1° 22′ E.), town, on Blaise, France; ancient *Durocasses;* from among ruins of castle rises the Chapel of St. Louis, burial-place of Orleans family; scene of defeat of Huguenots by Montmorency, 1562; boots and shoes. Pop. 8,000.

DREW, JOHN (1853), comedian; *b.* Philadelphia, Pa., the son of John Drew, a popular Irish American actor, and Louisa Lane Drew, a notable actress of English birth. He began his theatrical career in 1873 as a member of his mother's stock company in Philadelphia after studying at the Episcopal Academy in that city. Later he joined Augustin Daly's celebrated stock company in New York City, acting leading parts from 1879 to 1892 in a series of revivals of classical comedies. As a star under Charles Frohman's management in the presentation of modern plays, he continued to enact distinctive roles peculiar to his comedy vein, which he expressed at its best in portraying certain society types calling for a suave blending of genial cynicism and good-breeding. In 1922 he published *My Years on the Stage.*

DREW THEOLOGICAL SEMINARY a divinity school situated at Madison, N. J., for training ministers of the Methodist Episcopal Church. Its foundation in 1866 was due to the benefactions made by Daniel Drew, after whom it is named, and who gave the grounds and buildings, valued at $275,000. The tuition embraces both theology and a wide range of secular subjects to equip young ministers with a broad culture. The seminary is open to women on the same terms as men, and no tuition fees are charged. The institution embraces nine buildings, including the Cornell Library and Bowne Gymnasium, and in 1920 established a College of Missions. In 1922 the school had 200 students and 34 teachers under the presidency of Dr. E. S. Tipple.

DREWENZ (53° 4′ N., 18° 55′ E.), river, Germany, rises near Hohenstein, flows S.W., and enters Vistula.

DREXEL, ANTHONY JOSEPH (1826-1893), banker and philanthropist, *b.* Philadelphia, Pa. He entered his father's banking house, Drexel & Co., in that city when twelve years old and became a partner at twenty. Eventually he headed the banking institution which became affiliated with the Morgan house, with branches in London and New York. With George W. Childs he acquired the Philadelphia Public Ledger, in 1884. He made many gifts for philanthropic and educational objects, his most notable benefaction being the Drexel Institute of Art, Science, and Industry at Philadelphia, built and equipped at an outlay of several million dollars. He left an estate of about $30,000,000.

DREXEL INSTITUTE, an educational establishment situated in Philadelphia, Pa., founded in 1891 by Anthony J. Drexel, to provide instruction in the arts and sciences, industrial technology and commercial education. The courses are open for students of both sexes and there are day and evening classes. The tuition includes fine and applied arts, engineering, commerce and finance, mechanical drawing, machine construction, domestic science, mathematics, physics, chemistry and English. The courses in commerce and finance cover a comprehensive study of trade and economics, such as the production, sale and transport of commodities; corporation management; buying and selling securities; money and credit; import and export trade; advertising and bookkeeping. There is a growing commercial museum as well as an art gallery containing valuable collections and a voluminous library. The institute also extends its educational work by means of free public lectures and concerts. In 1922 there were 2818 students and 90 teachers under the presidency of R. G. Matheson, LL.D.

DREYFUS, ALFRED (1859), Fr. soldier; Alsatian Jew; victim of shameful political plot, 1894, due to Anti-Semitism (*q.v.*); rehabilitated, 1906. He served with distinction in the World War, rising to the rank of Colonel. See Dreyfus Affair.

DREYFUS AFFAIR, THE. In the autumn of 1894 Captain Alfred Dreyfus, an officer of the Fr. army, of Jewish parentage, studying at Staff Coll., was arrested on a charge of offering to sell military secrets to Germany; tried by court-martial, Dec. 19-22; prosecution relied upon *one* document, unsigned and undated—the *bordereau*, a schedule of the papers offered for sale. Experts were not unanimous that this was in the accused's handwriting, but his personal unpopularity, combined with strong Anti-Semitic feeling, led to his condemnation to military degradation and imprisonment for life on the Ile du Diable off coast of Fr. Guiana. Agitation for revision of sentence at once began. In July 1895 Colonel Picquart became head of Intelligence Dep.; leakage of military secrets continued, and he came to conclusion that Major Esterhazy was real culprit and author of *bordereau*. Esterhazy was acquitted, Jan. 11, 1898. By this time the *affaire* had assumed tremendous importance in the eyes of the people, and all France had become divided into two camps. Zola now entered the field with his open letter, 'J'accuse,' protesting the innocence of Dreyfus. After a second trial for libel Zola was sentenced to a fine and one year's imprisonment, which he evaded by leaving France. On Aug. 30 Colonel Henry, Picquart's successor, committed suicide after confessing that he had forged documents unfavorable to Dreyfus; and Cavaignac, who had read the forged documents in the Chamber of Deputies as proof of the guilt of Dreyfus, resigned the ministry of war. Finally, on Sept. 27, 1898, the Dreyfus verdict was referred to the Cour de Cassation, which quashed the sentence, and ordered a fresh trial, which took place at Rennes, Aug. 7-Sept. 9, 1899. Though the trial was marked by evasions and damaging admissions on the part of the military witnesses, Dreyfus was found guilty and sentenced to ten years' imprisonment. On Sept. 19, 1899, the president of the republic pardoned him, and he was liberated. M. Jaurès, the Socialist leader, continued the agitation, fresh documents were said to have been discovered, and again the case was referred to the Cour de Cassation, which in July 1906 quashed the Rennes verdict, and declared Dreyfus absolutely and entirely innocent of all charges. He was reinstated in the army with the rank of major, and received the Legion of Honor.

DRIFT (geol.) name formerly used to describe earth and rocks deposited on surface of land by icebergs or glaciers in Pleistocene epoch; (mining) direction of course of tunnels between two shafts in a mine.

DRILL. See Excavator.

DRILL, the *Papio* (or *Cynocephalus*) *leucophoeus*, is a baboon of the same genus as the mandrill, but it differs from this hideous creature in the absence of bright colors on its muzzle and nose. It is a ferocious inhabitant of West Africa.

DRINKER, HENRY STURGIS

(1850), university president; *b.* Hong Kong, China. Graduating from Lehigh University in 1871, he became an engineer on the Lehigh Valley Railroad in charge of the building of the Musconetcong tunnel, meantime studying law. He was admitted to the bar in 1878 and seven years later was appointed general solicitor to the railroad named, filling that legal post till 1905, when he became president of Lehigh University. Lafayette, Franklin and Marshall Colleges and the University of Pennsylvania conferred upon him their degrees of LL.D. His published writings include works on tunneling, explosive compounds and rock drills, and papers on water power development, natural resources and the taxation of forest lands.

DRINKING CUPS. From the earliest times when domestic vessels of any sort were used, it is probable special ones were fashioned for drinking purposes; sometimes natural vessels were used, such as coco-nuts or large eggs. Among remains of the New Stone and Bronze Ages vessels have been unearthed which it is supposed were intended for drinking. Among the remains of Ægean and anc. Gr. civilization, many drinking cups, some of beautiful shape, have been discovered—one, the golden cup of Mycenæ, with handles on each side. Endless shapes are found in pottery. In the Middle Ages drinking horns were frequently used, some very large; plain bowls are also found.

The finest examples, however, of cups are the chalices of the Church; these were often richly ornamented, and of very beautiful workmanship. At the Reformation in England the chalice gave place to simpler communion cups. For common use in the Middle Ages wood was employed. Among the few gold cups that remain is that of the Eng. kings, made about 1380, which, after various adventures, has found its way into the Brit. Museum. A big drinking cup was sometimes called a *hanap*, the ancestor of our 'loving cup.'

DRINKWATER, JOHN (1882), Eng. playwright, poet and critic. He was educated at Oxford High School and spent twelve years as a clerk in insurance offices. He became known to the reading public for his poems, and then as a dramatist in connection with the Pilgrim Players and the Birmingham Repertory Theatre. His plays include *Abraham Lincoln*, *Mary Stuart* and *Oliver Cromwell.*

DRIVING, act of impelling, forcing along, keeping an animal or machine in motion. The word is more generally applied to the art of directing horses or other draught animals, and as such dates back to the earliest hist. period. D., as a modern Eng. sport, may be said to have begun about the end of the XVIII. cent. with the introduction of springed carriages and macadamised roads, the latter being named after the inventor, John Loudon Macadam, 1756-1836. The first amateur driving club was formed about 1807. The driving of two horses side by side is known as 'double-harness'; one behind the other, 'tandem'; four horses in couples, 'four in-hand.'

DROGHEDA (53° 42′ N., 6° 21′ W.), seaport, Ireland, in Louth, Leinster, on river Boyne; industries include milling, brewing, iron-casting, and tanning; manufactures linen and cotton; trades chiefly with Liverpool. Poynings' Laws were enacted here, 1494. D. was stormed by Cromwell, 1649; surrendered to William III. 1690; near site of *Battle of Boyne*; remains of ancient ecclesiastical buildings and town walls. Pop. 12,500.

DROME (44° 40′ N., 5° 10′ E.), department, S.E. France; formed of parts of Dauphiné and Provence; capital, Valence; produces wheat, olives, fruit, and wine; minerals include iron, lignite, lead, copper; silk-worm rearing, flour-milling; iron and woolen goods. Area, 2533 sq. miles. Pop. 1921, 263,509.

DROMEDARY. See CAMEL.

DROPSY, accumulation of watery fluid in any of the cavities or tissues of the body, most often due to heart or kidney disease. Different terms are applied to d. in different positions: *anasarca*, in subcutaneous tissues; *ascites*, in the abdominal cavity; *hydrothorax*, in the pleural cavities; *hydropericardium*, in the pericardium; *hydrocephalus*, in the cavities of the brain.

DROWNING, death by submersion in water or some other liquid, due to asphyxia, through the liquid's preventing air going into the lungs. It was in former times a method of capital punishment, dating at least from the Romans, the last occurrence in Britain being the drowning of the Wigtown martyrs, 1685. In attempting to rescue a drowning person the rescuer should approach from behind to avoid being grasped if the person struggles, turn him on his back, and then, lying on his own back, the rescuer should swim away, holding the other at arm's length. It may be necessary to overpower the struggling person by holding him under the surface of the water by the nose and chin, or by raising his arms up from behind, with the rescuer's arms under his armpits so that further struggling is impossible.

Artificial respiration should be attempted at once with a person who is apparently drowned, and should not be discontinued for hours until it is quite certain that resuscitation is impossible.

DRUG (21° 8′ N., 81° 15′ E.), town and district, Chattisgarh division, Central Provinces, India. Area, 3807 sq. miles. Pop. 630,000.

DRUG, any substance used as a medicine or in the composition of medicines, often particularly meaning a poison; term applied to an unsaleable article—'a drug on the market.'

DRUG ADDICTION, the practice of taking drugs, such as heroin, cocaine, morphine or opium. The use of such narcotics, as well as of veronal and like products of coal tar, is habit-forming, and the user becomes known as a drug addict. In many cases the acquisition of the habit has been primarily due to the presence of drugs in physicians' prescriptions. The drug prescribed may be a sedative or soporific, like chloral, sulphonal, headache powders, alcohol or opium. A less but not small influence in the formation of the habit is contact with drug-using acquaintances or through dissipation. Suffering in incurable diseases produces the practice with a small number. Patent medicines, especially remedies for bronchial troubles, contain various soothing drugs; headache remedies, epilepsy and tobacco-habit cures also contain narcotics. The use of such preparations has tended to prepare the way for the foundation of a permanent drug habit.

Drug addiction has produced an extensive traffic in narcotics. The business is largely conducted in the underworld and supported by criminals. Drugs lead to crime, just as crime leads to drugs. To some extent the traffic is controlled by the Harrison anti-narcotic law, which requires that dealers in opium or coca leaves or any derivatives thereof shall register with the collector of inland revenue of the district, and each sale must be recorded. Several of the states have similar laws. There has grown in consequence an illicit drug traffic of considerable dimensions with world-wide ramifications. In 1922 Congress passed a measure prohibiting the import into the United States of any narcotic except sufficient crude opium and coca leaves (from which heroin and cocaine and other derivatives are manufactured) for medical and legitimate uses only, as determined by a Narcotic Board. The act also limits the export of narcotics. In New York State, the Boyland law which provides drastic regulations for the sale of opium, chloral, cocaine and heroin is a representative law.

DRUGGET (Fr. *droguet*), a common felt or coarse woolen fabric, often printed on one surface. The heavier kinds are chiefly used for covering carpets, hence called 'crumb-cloths' as a substitute for carpets, or as a lining or border. The lighter kind is used for table-covers. A strong dress-fabric of this name was formerly used largely for petticoats and workmen's aprons.

DRUG LAW. See ADULTERATION OF FOOD.

DRUIDISM, religion of ancient Gaul; also of Britain, where it reached its highest point of development. The Druids practiced divination and human sacrifice. The use of the mistletoe in England is a survival of D. Druids wore white robes and a coronet of oak.

DRUIDS, ORDER OF, masonic society, founded in London, 1781, with offshoots now in America, Australia, and Germany.

DRUMCLOG, moor on borders of Ayrshire and Lanarkshire, Scotland; scene of unimportant victory of Covenanters over king's troops under Graham of Claverhouse, 1679.

DRUM-MAJOR, since 1878 called the sergeant-drummer, the first or chief drummer in a regimental band, the officer who leads a drum-corps or band, directing its movements, and regulating the pace when on the march. He attends to the bugle calls and teaches the under-drummers. The D. ranks with the sergeants of the line.

DRUMMOND, HENRY (1786-1860), Eng. politician; associated with Edward Irving in founding Catholic Apostolic Church.

DRUMMOND, HENRY (1851-1897), Eng. minister and author; *b.* Stirling, Scotland. He entered the Free Church ministry after graduating from the University of Edinburgh and embarked on active mission work in support of the revivalist movement begun in Great Britain by Moody and Sankey. As professor of national science and of theology at the Free Church College in Glasgow, he began to exercise a great religious influence among college students and developed an evangelical movement that spread from England to her colonies and the United States, where, in 1879, 1887 and 1893, he lectured on religious, sociological, and scientific subjects. He sought to reconcile science and religion and with this end wrote his famous

Natural Law in the Spiritual World, published in 1883. Equally popular was his *Ascent of Man*, 1894, which stressed altruistic elements in natural selection, or what he called 'the struggle for the lives of others,' and *The Greatest Thing in the World*.

DRUMMOND, WILLIAM, OF HAWTHORNDEN (1585-1649), Scot. poet. His best work is contained in his sonnets. He was the entertainer, 1619, at his home, near Edinburgh, of Ben Jonson; his often-quoted *Conversations* with that great Elizabethan have caused much controversy, and were not intended for publication.

DRUMMOND ISLAND (46° N., 83° 40′ W.), island, Lake Huron, Michigan, U.S.A.

DRUMS, musical instruments, are of three kinds: *Bass* d's, *Kettle* d's, and *Side* d's. They consist of cylinders covered at each end with vellum. The two latter are tuned by means of screws on the rim of the instrument; first-named is regulated by means of leather braces fixed upon the zig-zag cord round the cylinder.

DRUNKENNESS. See ALCOHOLISM.

DRURY LANE THEATRE opened in 1663 with Beaumont and Fletcher's *The Humorous Lieutenant*; destroyed by fire, 1672; replaced, 1674, by Sir Christopher Wren's edifice, which was not demolished until 1791. This house saw the triumphs of Quin, Macklin, Peg Woffington, Kitty Clive, and Garrick, the unsuccessful first appearance of Sarah Siddons, and the production of some of Sheridan's comedies. The new house, erected 1794, was burned down in 1809. In the present theatre, which dates from 1812, Edmund Kean took London by storm, 1819; it came under the management of Macready in 1841, Dion Boucicault in 1862, and F. B. Chatterton in 1866. On Nov. 1, 1879, Sir Augustus Harris began his career of management, and made it the national home of spectacular melodrama. Irving made his farewell appearance in this theatre in 1905.

DRUSES, an Eastern people, largely of Arab stock, who are traditionally said to have been established in the neighborhood of Lebanon since the IX. cent. They now inhabit, besides the mountainous parts of Lebanon, parts of Anti-Lebanon and Hauran, Syria, and their numbers are estimated at from 100,000 to 150,000. Their religious system, which is very complex, is a mixture of Mohammedanism, Christianity, Judaism, and other creeds.

DRUSILLA, a daughter of Herod Agrippa I., King of the Jews. She was born A.D. 38. She married Felix Procurator of Judea and is mentioned in the Book of the Acts.

DRUSUS CÆSAR (*d.* 23 A.D.), only son of Emperor Tiberius; poisoned by his wife and her paramour, Sejanus.

DRUSUS, MARCUS LIVIUS, Rom. statesman; tribune with Gaius Gracchus, 122 B.C.; consul, 112; fought in Macedonia. His *s.*, of same name, was tribune 91 B.C.; reformed senate; murdered, 91 B.C.

DRUSUS, NERO CLAUDIUS (38-9 B.C.), *s.* of Livia, and bro. of Emperor Tiberius; Rom. general; fought in Ger. campaign, 12-9 B.C.; his sons were Emperor Claudius and Germanicus, *f.* of Emperor Gaius (Caligula).

DRY ROT, disease which attacks timber; caused by damp, or lack of fresh air. It is due to a fungus which eventually reduces the wood to powder.

DRYADES (or Dryads), in classical myth., nymphs associated with woods and trees.

DRYBURGH ABBEY, Præmonstratensian abbey, on Tweed, near Melrose, Berwickshire, Scotland; founded probably 1150; burnt by Edward II., 1322; restored but finally destroyed, 1545; burial-place of Sir Walter Scott.

DRYDEN, JOHN (1631-1700), Eng. poet and dramatist; *b.* Aldwinkle; *s.* of a Northamptonshire rector; Poet Laureate and Historiographer Royal, 1670. D. was a voluminous dramatist during the greater part of his life, but much of his dramatic work is characterized by the gross immortality of his age; he wrote Heroic plays in rhyme, and later adopted blank verse, as in his best-known play, *All for Love*. D. began his career as poet with *Heroic Stanzas on the Death of Oliver Cromwell*, 1658, followed by *Astroea Redux*, 1660, in celebration of the Restoration. One of his strongest poems, *Annus Mirabilis*, commemorating the Fire of London and Dutch War, appeared in 1667; *Absalom and Achitophel*, political satire, in 1681; *The Medal*, in 1682; *MacFlecknoe*, satire on the poet Shadwell, in the same year; *Religio Laici*, religion of a layman, in 1683; and *The Hind and the Panther*, defence of Church of Rome, in 1687. The strong, vigorous English of these poems, their keen invective, and satirical quality, give D. very high rank amongst Eng. poets. His poems, like his earlier plays, popularized 'heroic verse' (rhymed decasyllabic couplets) as opposed to 'blank verse.' The lyrical poems, *Ode* *for St. Cecilia's Day,* and *Alexander's Feast,* written in his later years, served but to increase his fame. His *Essay on Dramatic Poetry,* 1668, is valuable for its critical qualities and as a masterly piece of prose.

DRYING-MACHINE, apparatus for drying fabrics. A common type used in laundries is a perforated cylinder revolving within a metal cylinder at a great rate; by centrifugal force the water flies from inside to outside cylinder. Cotton may be dried by passing over rollers heated internally by steam, but linen is marred by this process.

DUAL PERSONALITY. See DOUBLE CONSCIOUSNESS.

DUALISM, any theory, philosophical or theological, based on two opposite principles. In metaphysics it means co-eternity of mind and matter; in theology, that there are good and evil gods, specially developed in Zoroastrianism and Manichæism, whence it influenced later Judaism and Christianity; difficulty of reconciling evil with omnipotence of a good God tends to dualism. Dualism is the opposite of Monism.

DUBAWNT.—(1) Lake, Canada (63° N., 101° 30′ W.); discovered, 1770. (2) River, Canada, rising 60° 15′ N., 104° 20′ W., and flowing through D. Lake into Hudson Bay; length, 750 miles.

DUBLIN, mar. co., prov. Leinster, Ireland, bounded N. and W. by Meath and Kildare, S. by Wicklow, E. by Irish Sea; part of central limestone plain of Ireland; mountainous in S.; chief riv., Liffey; nearly half of total area under grass, over one-third under crops; Grand and Royal canals traverse co.; rural pop. is densest in Ireland; returns four M.P.'s; chief towns are Dublin, Rathmines, Pembroke, Kingstown, Blackrock, and Balbriggan. Area, 358 sq. m.; pop. excluding metropolis, 172,400.

DUBLIN, city, seapt., parl. bor., cap. of Dublin co. and of Ireland; beautifully situated at mouth of the Liffey on Dublin Bay (53° 21′ N., 6° 16′ W.); well-laid-out city, built mostly on flat ground, with spacious streets, squares, and parks, and many handsome buildings. The principal business streets are in center; Sackville Street, most important thoroughfare, contains some fine buildings, including the Post Office, Nelson Pillar, and O'Connell's monument; finest squares are St. Stephen's Green, Merrion Square, Fitzwilliam Square, and Rutland Sq.; most notable buildings include Bank of Ireland (formerly Houses of Parliament), 'Four Courts,' Custom House, National Art Gallery, Museum of Natural History, Science and Arts Museums, National Library, Leinster House (once town house of Duke of Leinster, now seat of Royal Dublin Soc.), city hall, Rotunda, and many monuments and statues. Dublin Castle is an unimposing structure; most interesting churches are Prot. cathedrals of Christ Church, 11th cent., and St. Patrick, 12th cent.

City contains Dublin Univ. or Trinity Coll., founded 1591 by Elizabeth, and is seat of National Univ., founded 1908. Residential parts lie mostly in S.E.; Phœnix Park in W. contains the viceregal residence, barracks, military school, racecourse, zoological gardens, and Wellington monument; principal suburbs are Kingstown, Pembroke, Rathmines, Clontarf, Dalkey, and Killiney; Howth, Sutton, Malahide, and Bray are popular watering-places in neighborhood. Riv. Liffey is crossed by twelve bridges within limits of 'Circular Road'; banks lined with quays; near mouth of river are extensive docks. City is of little commercial importance; manufactures porter, whisky, and poplin; has foundries, water-works, shipbuilding yards, and a considerable export trade. Pop. 403,000.

On Easter Monday, April 24, 1916, a rebellion occurred in the city; volunteer forces, numbering 2,000 to 3,000, seized General Post Office and declared themselves 'The Provisional Government of the Irish Republic'; captured chief buildings and three railway termini; fighting and looting occurred till Tuesday morning, when troops from the Curragh and England arrived; street fighting was carried on and Sackville Street was gutted; Sir John Maxwell surrounded fighting centers, and rebels surrendered on Saturday; those who signed proclamation and six others were executed, many sentenced to long terms of penal servitude, and over 3,000 were deported to England. The government paid claims for damages to c. $15,000,000; the chief secretary, Mr. Birrell, resigned office. Captain Bowen Colthurst, later found to be insane, ordered Mr. Sheehy Skeffington and two others to be shot in Portobello Barracks. Total casualties to troops were 106 killed, and 334 wounded; to civilians, never fully ascertained, but 180 were buried and 614 treated for wounds in hospitals.

Following the agreement between England and Ireland and the formation of the Irish Free State, the first session of the Irish Parliament was formally opened in Dublin, on August 16, 1921. The opponents of the Free State fomented riots and disorders in the city which continued during 1921 and 1922. A body of Anti Free State troops took possession of the Four Courts Building in the city in June, 1922 and were dislodged by the Free State forces only after the buildings had been blown up and partially destroyed. Murders and riots continued throughout 1922 and less violently in 1923. The formal translation of power to the Irish Free State took place in Dublin castle on January 16, 1922. See IRELAND.

DUBLIN, a city of Georgia, in Laurens co., of which it is the county seat. It is on the Central of Georgia and other railroads, and on the Oconee River. Its industries include cotton and oil mills, fertilizer works, and plants for the making of hardwood products, cigars, etc. Pop. 1920, 7,707.

DUBNO, a town in Volhynia, S.W. Russia, on the Ikva river, N.E. of Lemberg. Before the World War it had a population of about 14,000, mostly Jews. It was the frequent scene of fighting between the Austro-Germans and Russians in the course of that conflict. In 1915 the town was entered by the Austrians and the Russians temporarily retired from the region. In February the next year the Austrians attacked the Russian positions south of the town, and in June the tide of war brought it into Russian possession again. In the later stages of the war it fell to the Germans. The town was held for a time by the Poles in their war with the Russian Soviet forces in 1920. Strategically, it formed one of three strongholds with Lutsk and Rovno built by the Russians.

DU BOIS, a borough in Pennsylvania, in Clearfield co. It is on the Buffalo, Rochester and Pittsburgh, the Pennsylvania, and the Lake Shore and Michigan Southern railroads. It is the center of an important bituminous coal region, and has glass and clay works, blast furnaces, railroad shops, machine shops, etc. There is a hospital and a public library. Pop. 1920, 13,681.

DUBOIS, GUILLAUME (1656-1723), Fr. cardinal; tutor to Duc de Chartres, 1687; sec., 1701; minister to him as Regent, 1715; formed with England and Holland Triple Alliance against Spain; unprincipled as statesman.

DUBOIS, JEAN ANTOINE (1765-1848), Fr. Catholic missionary in India; possessed great insight and sympathy with Hindus; wrote valuable works on Ind. life and religion.

DU BOIS, WILLIAM EDWARD BURGHARDT (1868), an American editor and author, born at Great Barrington, Mass. of negro descent, son of Alfred and Mary Burghardt Du Bois. He was educated at Fisk University and at Harvard and studied at the University of Berlin. He was professor of economics and history at Atlanta University from 1896 until 1910 when he became director of publicity of the National Association for the Advancement of Colored People, and editor of the Crisis Magazine. In addition to being editor of the Atlanta University Studies of the Negro Problem he was the author of: *The Suppression of the Slave Trade*, 1896; *The Philadelphia Negro*, 1899; *The Souls of Black Folk*, 1903; *John Brown*, 1909; *Quest of the Silver Fleece*, 1911; *The Negro*, 1915 and *Darkwater* in 1920.

DUBOWKA (49° 8′ N., 44° 48′ E.), town, Saratov, Russia. Pop. 16,000.

DUBUQUE, a city and port of Iowa, co. seat of Dubuque co., situated on the Mississippi. It is the seat of an Episc. and Rom. Cath. bishop, has a college, a German Presbyterian seminary, and a ladies' academy. At D. an iron railway bridge crosses the river, and the town is the oldest in the state, being now a manufacturing center. Pop. 1920, 39,141.

DU CANGE, CHARLES DUFRESNE, SIEUR (1610-88), a French scholar and historian, educated at the Jesuit College of Amiens, later studying law at Orleans. His most famous work is *Glossarium ad scriptores mediae et Infimae Latinitatis*, 1678 (completed later by Carpentier, Henschel, Faure, 1884-87), followed by a similar *Glossarium...Graecitatis*, 1688. He edited many Byzantine historians.

DUCAS, Byzantine family of eminence IX. to XII. cent's; one member, Constantine X. 1059, was Emperor of the East.

DUCAT, coin, of gold or silver, originally struck by Duke of Apulia, and current in Europe until XIX. cent.; Austria-Hungary retains the d.

DU CHAILLU, PAUL BELLONI. See CHAILLU, PAUL BELLONI DU.

DUCHESNE, LOUIS MARIE OLIVER (1843), Fr. ecclesiastic; edited *Liber Pontificalis*, 1886-92, and is author of many works on Church history, including *Early History of the Christian Church*, 1909-13, Eng. trans., which was placed on R.C. Index. Elected to Fr. Academy, 1911.

DUCK FAMILY (*Anatidae*), a family containing over two hundred species of birds, comprising swans, geese, and ducks, and found in all parts of the world. They are typical swimming birds with webbed feet and short legs set far back on long bodies, so that they swim strongly, but walk on land with stilted, awkward gait. Their wings are strong and carry their heavy bodies with great speed through the air. The bill is characteristic: flattened, covered with soft, sensitive skin, and fringed by a series of fine, tooth-like plates, which interlock and form a sieve through which the mud wherein they seek their food is strained. They live upon worms, molluscs, and aquatic insects; and although they are found most frequently in flocks near rivers and lakes, in winter they betake themselves to the kindlier sea-shore. Many are migratory, only four are residents, while sixteen are uncertain visitors and twenty-two are regular visitors, many of them staying to breed. Some of these and their relatives are mentioned below.

The *Swans* are familiar to all on account of the graceful so-called mute swan, (*Cygnus olor*,) distinguished by the black tubercle or 'berry' between its eyes. It is almost a domesticated bird, common on some rivers and lakes, but occasionally it reverts to a semi-wild state. Less graceful is the wild swan or whooper (*C. musicus*), which carries it neck straight as it swims. Almost as familiar as these, on account of its presence in ornamental parks, is the black swan (*Chenopsis atrata*) of Australia.

Amongst the *Geese* may be mentioned the greylag goose (*Anser cinereus*), which is the probable ancestor of domesticated geese; the black-headed brent goose (*Bernicla brenta*); and the Greenland white-faced bernicle goose (*Bernicla leucopsis*).

The true ducks, the male of which is known as a drake, are smaller, with shorter necks and more varied plumage than the swans and geese, and may be divided into sea- or diving-ducks and non-diving ducks. The former, whose names indicate their habit, include many winter visitors, such as the porchard or dunbird (*Fuligula ferina*), with dense black collar and breast, nearly related to the canvas-backed duck (*Aythya vallisneria*); the scaup (*Fuligula marila*); the golden eye (*Clangula clangula*); the eider (*Somateria mollissima*) and the common scoter (*Oedemia nigra*), while the merganser (*Mergus merganser*) nests also in Ireland. Amongst the non-diving ducks are the sheldduck (*Tadorna cortuta*), the teal (*Nettium crecca*), and the 'wild duck' or mallard (*Anas boscas*); best known as winter visitors are the gadwall (*Chaulelasmus streperus*), the widgeon (*Marcca penelope*), and the shoveller or 'spoonbill' (*Spatula clypeata*), and a solitary rare spring visitor is the garganey (*Querquedula querquedula*).

DUCKING STOOL, chair fixed on end of see-saw beam, projected over pond, in which scolding women, alleged witches, and others were 'ducked' by way of punishment; used in XVII. to XIX. cent.

DUCK-WEED, minute perennial plant (*Lemna minor*) with long roots; floats on still water.

DUCKWORTH, SIR JOHN THOMAS (1748-1817), Brit. admiral; commanded naval brigade at *Minorca*, 1798; won *San Domingo*, 1804.

DUCTILITY, power of extension, differing from elasticity in that latter implies extension and resumption of original position; most metals are ductile and can be drawn into wires.

DUCTLESS GLANDS, glands existing in various parts of the animal body which discharge their secretions direct into the blood stream and not into special channels. The secretions are known as hormones and are believed to exert a remarkable influence over the development of the body, and the co-operation of its parts. The thyroid glands, which exist on either side of the windpipe, secrete a hormone which greatly influences vitality, a deficiency causing general feebleness, while an excess leads to wasting away and nervous excitement. The pituitary gland influences growth, overdevelopment producing giants. Other glands influence the growth of sexual characteristics and instincts, while the thymus gland prevents the sex-organs from developing too early. See GLANDS.

DUDERSTADT (51° 31′ N., 10° 15′ E.), town, Hanover, Germany; has number of interesting churches; cottons, woolens manufactured. Pop. 6,000.

DUDEVANT, MME., see SAND, GEORGE.

DUDLEY (52° 31′ N., 2° 5′ W.), market town, Worcestershire and Staffordshire, England; in midst of 'Black country'; has remains of castle supposed to date from VIII. cent.; important seat of iron trade; extensive coal-fields; limestone quarries. Pop. 1921, 57,100.

DUDLEY, EDMUND (*c.* 1462-1510), Speaker of House of Commons; principal minister of Henry VII.; notorious for extortions along with Empson; executed.

DUDLEY, THOMAS (1576-1853), Amer. colonist, of same family as Earl of Leicester; became extreme Puritan; went to America, 1630; deputy gov. of Massachusetts several times; helped to found Harvard Coll.; sternly opposed religious toleration; father of Joseph Dudley, 1647-1720, gov. of Massachusetts.

DUDWEILER (49° 17′ N., 7° 2′ E.), town, Rhine Province, Prussia; coal mines and ironworks. Pop. 20,000.

DUELS.—The *duel* as it is in modern times did not exist in ancient Greece and Rome. In the Middle Ages trial by compurgation of oath was developed, and from that judicial combat. The modern d. differs from this latter in that it has no elaborate sanction of law or religion. Duelling seems to have developed first in France, and more widely there than in any other country. Frequent attempts were made by legislature to check it (*e.g.* by Richelieu), but without avail. In the years 1601-9, 2000 men of gentle family are said to have met their death in duelling. At the time of the Revolution it was hoped by some that this would disappear together with other ancient abuses, but though checked for a time it soon 'came in' again, and d's still take place in France.

There were few d's in England before the early XVII. cent. Several famous d's took place in England in the first half of the XIX. cent. in which, amongst others, the Duke of York, Lord Byron, and the Duke of Wellington took part; 172 d's, of which 91 proved fatal to one of the combatants, were fought during the reign of George III. In the 'duelling' amongst Ger. students precautions are taken to protect all vital parts of the body.

DUFAURE, JULES ARMAND STANISLAUS (1798-1881), a French statesman, born at Saujon, Charente-Inférieure, France. Under the premiership of Guizot he became Councillor of State, 1836, and Minister of Public Works, 1839. He acted as Minister of the Interior after 1870, and was Minister of Justice successively in 1871, 1873, 1875, and 1876, when he was made Premier, a position which he resigned in 1879 at the termination of MacMahon's presidency.

DUFFERIN AND AVA, MARQUIS OF, FREDERICK TEMPLE HAMILTON TEMPLE BLACKWOOD (1826-1902), Brit. diplomatist; succ. his *f.* as Baron D., 1841; commissioner in Syria, 1860-61; Under-Sec. of State for India, 1864-66; chancellor of duchy of Lancaster, 1868-72; cr. Earl of D., 1871; gov.-gen. of Canada, 1872; ambassador to Russia, 1879; Turkey, 1881; commissioner in Egypt, 1882-83; Viceroy of India, 1884-88; cr. Marquis of D. and A., 1888; ambassador to Rome, 1888; Paris, 1892-96; a gifted diplomat.

DUFF-GORDON, LADY LUCIE (1821-69), Eng. authoress; *Letters from the Cape*, etc., and numerous translations.

DUFFEY, JAMES ALBERT (1873), a bishop, *b.* at St. Paul, Minn., son of James and Joanna Shiely Duffey. He was educated at St. Thomas College and St. Paul Seminary. After being ordained a priest of the Roman Catholic Church in 1899, he was pastor of the Immaculate Conception Church, Minneapolis until 1902 and later became pastor of St. Ann's Church at Le Sueur, Minn. from which he resigned on account of ill health and became pastor of the Cathedral, Cheyenne, Wyo., and chancellor of the diocese. In 1913 he was consecrated bishop of the newly created diocese of Kearney, Neb., now diocese of Grand Island.

DUFFY, SIR CHARLES (1816-1903), Irish author and politician; member of 'Young Ireland' party; subsequently emigrated to Australia, and became Prime Minister of Victoria; edit. *Ballad Poetry of Ireland*, and wrote numerous original works.

DUGDALE, SIR WILLIAM (1605-86), Eng. antiquary; he pub. *Monasticon Anglicanum*, 1655-73; best ed. 1817-30; *Antiquities of Warwickshire*, 1656, result of 20 years' research; *History of St. Paul's Cathedral*, 1658, etc. A staunch royalist during Civil War. On Restoration was made Norroy and Garter Principal King of Arms.

DUGONG (*Halicore*), herbivorous mammal inhabiting Red Sea, Indian Ocean, and N. Australian waters; length, 5-15 ft.; d.-fishing practiced on Queensland coast; blubber made into oil.

DUG-OUT term applied during the World War to the places of shelter dug in the side of trenches or underground; also a popular appellation for retired officers who were brought back into active service for the period of the war.

DUGUAY-TROUIN, RENÉ (1673-1736) Fr. admiral; harried coasts of England and Ireland; celebrated for amazing daring in attacks on Eng. and Dutch ships; captured Rio Janeiro, 1711.

DU GUESCLIN, BERTRAND (*c.* 1320-80), constable of France; served in many campaigns, 1341 onwards; at first for Charles of Blois, then for Fr. king; fought against English in France from 1356; constable, 1370; recovered from English Poitou, Auvergne, and Guienne; *d.* in laying siege to Châteauneuf-Randon.

DUHAMEL, JEAN BAPTISTE (1624-1706), Fr. natural philosopher; author of scientific works.

DUHAMEL DU MONCEAU- HENRI LOUIS (1700-82), Fr. scientist; made discoveries in science, chiefly in bot.; made improvements in Fr. navy.

DUHRING, EUGEN KARL (1833-1901), Ger. thinker; became totally blind; works on philosophy and economy; in many ways follower of Comte.

DUIKER, term including various varieties of African antelopes; also used of small agile animal found in S. Africa.

DUILIUS, GAIUS (*fl.* 260 B.C.), Rom. consul; performed brilliant services against Carthagenians.

DUKE (Lat. *dux*, leader), now highest title in Eng. peerage. Edward, the Black Prince, cr. D. of Cornwall, 1337, was the first Eng. d. The premier Eng. dukedom is Norfolk. A d's coronet has eight strawberry leaves.

DUISBURG tn., Rhineland, Germany (51° 26′ N., 6° 47′ E.); port with extensive docks and harbor; shipbuilding; chemicals, brass goods, sugar, textiles. Pop. 229,500.

DUKHONIN, GENERAL, a Russian military officer who figured in the last phases of Russia's participation in the World War. In the fall of 1917 he served as commander-in-chief of the Russian forces in the field in succession to General Kornilov, after the Bolshevists had seized possession of the government. The Germans were overrunning the country and the Bolshevists leaders, bent on withdrawing Russia from the war, ordered him to cross the lines with a flag of truce and open peace parleys with the Germans. He refused to do so, whereupon he was dismissed from his command and on December 1 his surrender was requested by Premier Lenin. Two days later he was thrown from a moving train by a mob of soldiers and sailors and killed.

DUKLA PASS, an opening or defile through the Carpathian mountains, about 1650 feet in elevation, to the west of Przemysl and Lemberg. The pass was seized by General Brussilov in the Russian drive against Austria-Hungary in the early stages of the World War of 1914-18, only to be abandoned, recovered, evacuated, and entered again by the Russians. Fighting in its vicinity in 1915 favored the Austrians and caused a Russian retreat.

DULCIMER, musical instrument, derived from Jewish psaltery, consists of wooden frame, with strings stretched across, which are struck with hammer.

DULCIGNO (41° 54′ N., 19° 12′ E.), small seaport town, Jugo-Slavia, on Adriatic; fishing; boat-building. Pop. 5,000.

DU LHUT DANIEL GRESOLON a Fr. explorer, *b.* about 1645. In 1670 he went to Canada where he became a trader and a leader of bush rangers. He selected the sites of Detroit and Fort William, and fought several wars against the Indians. In 1695 he was commander of Fort Frontenac. The city of Duluth, Minnesota is named for him.

DULKEN (51° 16′ N., 6° 21′ E.), town, Prussia, in Rhine province; iron foundries. Pop. 10,000.

DULONG, PIERRE LOUIS (1785-1838), Fr. scientist; made valuable researches in chem. and physics; prof. of Physics, 1820 and director, 1830 of the Polytechnic School, Paris.

DULUTH, a city of Minnesota, in St. Louis co., of which it is the county seat. It is the terminal point of several important railroad systems, including the Northern Pacific, Chicago and Northwestern, and the Great Northern. It is at the head of Lake Superior and at the mouth of St. Louis River. It has an excellent harbor on St. Louis Bay, which extends 9 miles into the lake and is enclosed by natural breakwaters. Duluth is connected by steamship lines with all important cities on the Great Lakes, and has a large commerce in many important commodities, including coal, iron, grain, lumber. This is greatly facilitated by the Sault Ste. Marie canal, the traffic through which now exceeds that of the Suez canal. Duluth, while essentially a commercial city, has important industries including the manufacture of lumber, iron and steel products. It has also glass factories, railroad car shops, etc. In the vicinity are valuable quarries of granite and sandstone. There is an unusual number of handsome public buildings. The Federal buildings are among the finest in the West. Others are a high school, city hall, Chamber of Commerce, public library, State Normal School, and Lyceum Theatre. There are over 60 churches, many of which are of excellent architectural design and construction. There are many public and private banks and trust companies. Duluth was named after Captain Du Lhut, a French explorer, who built a hut in 1670. It was chartered as a city in 1869 and was later enlarged by the addition of several suburbs. Pop. 1920, 98,917.

DULWICH (51° 27′ N., 0° 6′ W.), suburb of London in borough of Camberwell; D. Coll., founded 1619 by Edward Alleyn, and comprising two schools, contains celebrated collection of pictures. Pop. D. division of Camberwell, 102,000.

DUMA, Russian term for council. The Gosurdàrstvennaya Duma ('Council of

State') was created by imperial ukase, Aug. 19, 1905 'to take a constant and active part in the elaboration of law,' and under constitution of Oct. 30, 1905, it was ordained that no law should be valid without its consent. First Duma assembled May 10, 1906, dissolved by the Tsar on July 22, 1906; second sat from March 5 to June 16, 1907; third, Nov. 1, 1907, to June 1, 1912; fourth, elected in Sept. 1912, came to an end with the overthrow of the Tsardom and the declaration of a republic, March 1917. See Bolshevism; Russia.

DUMAGUETE (9° 20′ N., 122° 30′ E.), town, Negros, Philippine Islands; on S.E. coast; district fertile and agricultural. Pop. 14,000.

DUMANJUG (10° 4′ N., 123° 26′ E.), town, port, at mouth of Dumanjug, Cebú, Philippine Islands; important coast trade. Pop. 30,000.

DUMAS, ALEXANDRE (1802-70), Fr. novelist and dramatist; *b.* Villers Cotterets (Aisne); *s.* of a general; grandson of a marquis and Haitian negress. His early years were spent in poverty, and he received little education. He came to Paris, received an appointment in the bureau of the Duke of Orleans, and took to playwriting. His first play, *Henry III. and his Court*, 1829, started the Fr. Romantic Drama. It was followed by many more, notably *Anthony* and *The Tour de Nesle*. In 1836 he began writing Fr. history in a series of novels, of which the most famous are *The Three Musketeers*, 1844; *Twenty Years After*, 1845, and *Margaret of Valois*, 1845; in all his many novels D. was helped by collaborators, with whom he afterwards quarrelled. Besides hist. novels, he wrote his masterpiece, *The Count of Monte Cristo*. After making and giving away several fortunes, he *d.* a poor man. His work is notable for its imagination, exuberant vitality, and chivalric spirit.

DUMAS, ALEXANDRE, *fils* (1824-95), Fr. novelist and dramatist; natural *s.* of Alexandre D. and a dressmaker. He achieved his first success with a novel, *La Dame aux Camelias*, 1848, which he afterwards dramatized. Other famous works are *Le Demi-Monde* and *L'Affaire Clemenceau*.

DUMAS, GUILLAUME MATHIEU, COUNT (1753-1837), Fr. general; fought in Turkey, Holland, Revolutionary campaigns, and under Napoleon and Louis XVIII.; wrote *Precis des evenements militaires*.

DUMAS, JEAN BAPTISTE ANDRE (1800-84), Fr. chemist and politician; made many important researches and pub. several new theories in chem.; was Minister of Agriculture, 1850-51 and a senator.

DU MAURIER, GEORGE LOUIS (1834-96), Eng. artist and novelist; was an analytical chemist in early life, but later adopted the profession of art, achieving fame as a *Punch* artist and book-illustrator. He wrote three novels: *Peter Ibbetson*, *Trilby*, and *The Martian*.

DUMBA, KONSTANTIN THEODOR (1856), Austrian diplomat; *b.* Vienna. After serving as Minister to Sweden for several years, in 1913 he was appointed Austro-Hungarian ambassador to the United States, and held that post when the World War broke out in 1914. In 1915 he became involved with German embassy agents in a country-wide conspiracy to foment strikes in American munition and other factories in order to thwart the delivery of war material to the Allies. Upon his exposure through captured documents his recall was demanded by the United States on the ground of improper conduct. The Austrian government assented and in October, 1915, he sailed from New York under a British safe conduct. The German naval and military attaches, Boy-Ed and Von Papen, were later banished from the United States for their part in interfering with American industry.

DUMBARTON (55° 57′ N., 4° 34′ W.), town, capital of Dumbartonshire, Scotland; parliamentary and royal burgh; rising seaport; old capital of Strathclyde; has historic castle on rock (250 ft. high) on banks of Clyde; one of four fortresses maintained in terms of Articles of Union; shipbuilding yards. Pop. 1921, 22,933.

DUMBARTONSHIRE (56° N., 4° 40′ W.), maritime county, on Firth of Clyde, W. Scotland; area, 267 sq. miles; chief towns, Dumbarton, Clydebank, Helensburgh. Northern district round Loch Lomond and Loch Long is mountainous, with grand scenery; industries include cotton works, calico-printing, bleaching, dyeing, paper-making, ship-building, fisheries, coal-mining. D., once part of Lennox, became united to Scot. kingdom, 843; scene of much warfare from Rom. invasion onwards. Pop. 1921, 150,868.

DUM-DUM (22° 38′ N., 88° 28′ E.), town and cantonment, Paraganas district, Bengal, India; ammunition factory; gives name to *Dum-dum* or soft-nosed bullet, which expands on striking. Pop. 11,000.

DUM-DUM BULLET, an expanding

hollow-nosed missile. When it strikes a person from a gun, a dum-dum bullet spreads on the impact and inflicts a jagged wound, flattening out against a bone and shattering it. By contrast the sharp-nosed bullet, steel coated, used by modern armies, penetrates without causing other than a clean wound. The dum-dum bullet is so called from its original manufacture at Dum-Dum, a town and cantonment in Bengal, British India. It was adopted in early Indian frontier fighting against the headlong rushes of Afghan tribesmen, the usual types of bullets having failed to wrest their fanatical onset. Dum-dum bullets have been condemned as wrongful weapons of warfare and their use was prohibited by the second Hague Conference. The ordinary bullet has been so termed after the sharp point is filed down so that it expands on impact. Charges of using dum-dum bullets were made against the British in the Boer War, against the Spaniards in the Spanish-American war, and against the Germans in the World War.

DUMFRIES (55° 4′ N., 3° 36′ W.), picturesque town, on Nith, S.W. border of Dumfriesshire, Scotland; capital of county; royal and parliamentary burgh, and practically the metropolis of a great part of southern Scotland; associated with Robert Burns. Pop. 1921, 15,778.

DUMFRIESSHIRE (55° 10′ N., 3° 30′ W.), border county, Scotland, bounded on S. by Solway Firth; length, 21-46½ miles; breadth, 13-32 miles; area, 1103 sq. miles. Northern region constitutes part of Southern Highlands of Scotland. Southern region is divided into three large basins, through which run the Nith, Annan, and Esk. D. is an agricultural and pastoral county. Manufactures include hosiery (in Thornhill and Lochmaben) and tweeds; Langholm manufactures coarse linen; woolen fabrics are made at Sanquhar and Moffat. Pop. 1921, 75,365.

DU MOND, FRANK VINCENT (1865), artist; *b.* Rochester, N.Y. He studied at Paris as a pupil of Boulanger, Lefebvere and Benjamin-Constant and in 1890 exhibited at the Salon there, receiving a medal. He was also awarded medals for his work exhibited at Boston and at the Atlanta, Buffalo and St. Louis Expositions. He became of note through the extensive appeal of his subjects which embraced religious and ideal themes and popular magazine work, and as a teacher at the Art Students' League.

DUMONT, ANDRE HUBERT (1809-57), Belg. geologist and mineralogist; prof. of Geol. and rector of Liége Univ.; made a valuable geological map of Europe.

DUMONT D'URVILLE, JULES SÉBASTIEN CÉSAR (1790-1842), Fr. navigator; was in charge of expedition to explore Polynesia and discover traces of La Pérouse, 1826-9; explored Antarctic regions, discovering various islands 1837-40; results of former voyage pub. in 15 vols., 1830-4, and of latter in 24 vols. 1841-54.

DUMOURIEZ, CHARLES FRANÇOIS (1739-1823), Fr. general; fought in Seven Years War, and then in Revolution campaigns; Minister of Foreign Affairs, 1792; defeated Prussians at *Valmy* and Austrians at *Jemappes*, 1792.

DUNBAR (56° N., 2° 31′ W.), royal burgh and seaport on N.E. coast of Haddington, Scotland; a place of historic interest, with ancient ruined castle on rocks projecting into the sea, and before introduction of gunpowder considered impregnable. Near D. Cromwell defeated Scots, 1650. Pop. 1921, 3,839.

DUNBAR, GEORGE (1774-1851), Scot. scholar; compiled noted Gk. lexicon.

DUNBAR, PAUL LAURENCE (1872-1906), Amer. negro poet and novelist.

DUNBAR, WILLIAM (*c.* 1465-1530), Scot. poet of Chaucerian school. His *Golden Target* and *The Thistle and the Rose* show the allegory-work of the time, but in *The Twa Maryit Wemen and the Wedo*, *The Dance of the Seven Deadly Sins*, and *Kind Kyttok* he is far ahead of the Chaucerians in imagination and realism.

DUNBLANE (56° 12′ N., 3° 57′ W.), market town, on Allan, Perthshire, Scotland; ancient cathedral, recently restored, serves as parish church. Pop. 3,000.

DUNCAN I. (*d.* 1040), king of Scots; succ. Malcolm II., 1034; murdered by Macbeth.

DUNCAN II. (*d.* 1094), king of Scots; *s.* of Malcolm III., and grandson of above.

DUNCAN, ADAM, 1ST VISCOUNT (1731-1804), Brit. naval officer; *b.* Scotland; entered navy, 1746; commander-in-chief of North Sea fleet, 1795; won great victory of *Camperdown*, 1797, and cr. Viscount D. of Camperdown; his *s.* received earldom.

DUNCAN, GEORGE BRAND (1861), army general; *b.* Lexington, Ky. He graduated from West Point in 1886, when he was commissioned a second lieutenant in the 9th Infantry. He became captain in 1899, major in 1909, lieutenant colonel in 1915 and major general in 1918. He saw service in Cuba and the Philippines. In the World War he went to France with the American Expeditionary Force in 1917, commanded a sector at Toul, and took further part in the fighting as commander of the 77th division at Baccaret and on the Vesle. He commanded the 82nd division during the Meuse-Argonne offensive in 1918, and until its demobilization. He received the Distinguished Service Medal of the United States, and the Croix de Guerre from France, who also made him a commander of the Legion of Honor, while Great Britain made him a Companion of the Bath.

DUNCIAD, THE, a celebrated satire published in 1728 in three books, to which a fourth was added in 1742, in which Alexander Pope takes revenge for the hostility of critics by holding them up to ridicule as members of the court of Dullness.

DUNDALK (54° N., 6° 24′ W.), seaport, Ireland, capital of Louth, at mouth of Castleton, Dundalk Bay; grain, dairy produce, brewing and distilling; here Irish and English defeated Scots under Edward Bruce, 1318. Pop. 13,000.

DUNDEE (56° 27′ N., 2° 59′ W.), third largest city in Scotland; royal burgh, great seat of manufacture, and extensive seaport, Forfarshire, on N. side of Firth of Tay, at end of Tay Bridge. The harbor is one of the finest, safest, and most convenient in U.K.; shipbuilding; naval base for submarines; D. is great seat in Britain of jute, flax, hemp, and coarse linen industries. D. has been royal burgh since XIII. cent.; early and eagerly espoused Reformation; destroyed by Monk, 1651. Pop. 1921, 168,217.

DUNDEE (28° 10′ S., 30° 8′ E.), town, Natal, S. Africa; coal mining.

DUNDEE, JOHN GRAHAM OF CLAVERHOUSE, VISCOUNT (*c.* 1649-89), Scot. leader of Stewart cause; *s.* of Sir William Graham; served under Montrose, 1678, in suppression of Covenanters; defeated by Covenanters at *Drumclog*, 1679; killed Richard Cameron at Aird's Moss after *Bothwell Brig*; in 1688 served in interest of James II., and was cr. Viscount D. On July 27, 1689, he was killed in the moment of victory at *Killiecrankie*.

DUNDONALD, THOMAS COCHRANE, 10TH EARL OF (1775-1860), Brit. admiral; M.P. in 1806; attacked naval abuses; fought for Chile, Brazil, and Greece.

DUNEDIN, town, New Zealand (45° 52′ S., 170° 31′ E.); cap. of Otago prov., on hilly site at end of Otago harbor; founded and called after Edinburgh by Scot. settlers, 1848; industries include woolens, chemicals, soap, candles, frozen meat; has railway workshops. Pop. 1921, 72,255.

DUNES, BATTLE OF THE, DUNKIRK (June 4, 1658), when French and English defeated Spaniards under Don John of Austria, and secured capitulation of Dunkirk.

DUNFERMLINE (56° 4′ N., 3° 28′ W.), city, S.W. Fife, Scotland; royal and parliamentary burgh of great hist. interest; ruined royal palace, probably built *c.* 1300; birthplace of David II., James I. of Scotland, Charles I.; abbey, dating from 1072; tombs of Bruce and other royalties. Modern D. owes much to its native, Mr. Andrew Carnegie, who gave $2,500,000 to the city; burgh limits now include Rosyth; seat of damask linen trade; coal-fields. Pop. 1921, 39,886.

DUNGARPUR (*c.* 24° N., 74° E.), native state, Rajputana, India. Area, 1447 sq. miles. Pop. 160,000.

DUNKERS. See BRETHREN, CHURCH OF THE.

DUNKIRK, a city of New York, in Chautauqua co. It is on the Erie, the Lake Shore, and Michigan Southern, Pennsylvania, and other railroads, and on Lake Erie, 40 miles S.W. of Buffalo. It has an excellent harbor and facilities for the handling of freight traffic. It has important industries, including the manufacture of locomotives, foundry products, and lumber, and has also grain mills and grain and coal elevators. There is a beautiful park overlooking Lake Erie. Dunkirk is a popular summer resort. Pop. 1920, 19,336.

DUNKIRK, or **DUNKERQUE,** fort. seaport., dep. Nord, France (51° 2′ N., 2° 23′ E.), on Strait of Dover, 152 m. N. of Paris; ranks third among Fr. ports, rivalling Bordeaux; large artificial harbor; numerous connecting canals; extensive and varied manufactures and exports, and important fisheries; has fine church of St. Eloi, 1560; chapel of Notre Dame des Dunes, 1405; town burned by English, 1388; taken by them in 1658, but sold to Louis XIV. by Charles II., 1662. Pop. 39,000.

In World War, after fighting front stretched northwards to the shores of the North Sea, Dunkirk became an important Allied base, which the Germans attempted to gain in their great battles in Flanders from the Yser in 1914 to the Lys in 1918. After the fall of Antwerp Belgian refugees poured into Dunkirk, which became a Belgian military depot. Subsequently Joffre concentrated strong French forces in the vicinity. Throughout the war the town maintained a cosmopolitan character. It was the base of the Fr. patrol service on the northern coast, and a station for Fr. and Brit. naval aeroplanes. Naturally such an important military point was frequently bombed by Ger. aircraft, and many civilians perished as a result. In April 1915 a powerful Ger. land-gun threw shells into Dunkirk, at a range of about 25 m., from a position near Dixmude; but Allied aeroplanes succeeded in putting it out of action. On March 26, 1917, Ger. torpedo boats made a raid on the town, which also suffered heavily by an attack of Ger. aircraft on Nov. 9, 1917, a hospital at Zuydcoote being hit by incendiary bombs.

DUNMORE, a borough of Pennsylvania, in Lackawanna co. It is on the Erie and Lackawanna railroads, and adjoins the city of Scranton. It is the center of an important anthracite region and there are also manufactures of brick, stone, and silk. Here is St. Mary's Academy and several homes for children and the old. Pop. 1920, 20,250.

DUNN, HERBERT OMAR (1857), a rear-admiral, *b.* at Westerly, R.I., son of Edward Maxson and Desire Anne Gavitt Dunn. He graduated from the United States Naval Academy in 1877 and after advancing through various grades was made a rear-admiral in 1916. He served on various duties and stations, including service during the Spanish-American War on board the Terror operating in the West Indies, also on board the Buffalo during the Boxer troubles in China, commanded the Naval Base, Punta Delgada, Azores, during 1918 and 1919 and from then until 1921 was in command of the 1st Naval District, Boston.

DUNNE, EDMUND M. (1864), a bishop, *b.* at Chicago, son of Maurice and Catherine Walsh Dunn. He was educated at St. Ignatius College, Chicago; Niagara University; Seminaire de Floreffe, Belgium and also Louvain University of Belgium. He was ordained a priest of the Roman Catholic Church in 1887 and from 1890-8 was assistant pastor of Columbkill's parish, Chicago. He founded the Guardian Angel parish (Italian) and built church and rectory, 1898-1905. From 1905-9 he was chancellor of Chicago diocese and on June 29, 1909, was appointed, and September 1, 1909 consecrated bishop of Peoria, Peoria, Ill.

DUNNE, EDWARD JOSEPH (1848), Roman Catholic prelate; *b.* Tipperary, Ireland. He came with his parents to the United States in his infancy. He studied for the Church at the Theological Seminary at Baltimore, where he was ordained priest in 1871. Afterwards he became rector of All Saints, Chicago, until 1893, when he was appointed bishop of the diocese of Dallas, Texas, in succession to Bishop Thomas Brennan. To his resourcefulness was due the erection of the Roman Catholic cathedral in that city, one of the most imposing structures in the southwestern States. Among other religious institutions established during his bishopric were the Vincentian College, St. Paul's Sanitarium, the Ursuline Academy, novitiate and provincial house, and an industrial school for colored children.

DUNNE, FINLEY PETER (1867), humorist and journalist; *b.* Chicago. He received a public school education in his native city and in 1885 became a reporter, then city editor of the Chicago Times. He was a member of the editorial staff of the Chicago Evening Post, and Times-Herald, from 1892 to 1897, and thereafter edited the Chicago Journal till 1900. Meantime he began to be known for the humorous philosophy he expressed through the medium of 'Mr. Dooley,' a saloonkeeper, in a series of newspaper sketches which first appeared in the Times-Herald. He removed to New York City, where he joined the American Magazine as associate editor, and continued his Dooley sketches through that and other popular periodicals. The Spanish-American war inspired him with a genial vein of Irish-American comment that made Mr. Dooley a popular oracle on both sides of the Atlantic. His writings were collected in book form under the titles of *Mr. Dooley in Peace and War*; *Mr. Dooley in the Hearts of his Countrymen*; *Mr. Dooley's Philosophy*; *Mr. Dooley's Opinions*; *Observations of Mr. Dooley*; *Dissertations of Mr. Dooley*; *Mr. Dooley Says*; and *Mr. Dooley on Making a Will*, 1919. He was a frequent contributor of editorial comments to Collier's Weekly, which he edited from 1917 to 1919. In 1923 he revived Mr. Dooley as a commentator on current events in the pages of the New York World.

DUNOIS, JEAN, COUNT OF (1403-68), Fr. general; natural *s.* of Duke of Orleans; commonly known as the 'Bastard of Orleans'; famous for military exploits.

DUNRAVEN AND MOUNT-EARL (WINDHAM THOMAS WYNDHAM-QUIN), EARL OF, (1841), Eng. politician and sportsman; as president of Irish Reform Association, 1905, he propounded the devolution scheme, and has twice attempted to win the America Cup. He served in S. Africa, 1899, and during the World War.

DUNS SCOTUS, JOHN (1265 or 1275-1308), mediæval schoolman, studied at Oxford and Paris; critical theologian, and antagonist of St. Thomas Aquinas over Immaculate Conception, reason, and revelation.

DUNSANY, EDWARD JOHN MORETON DRAX PLUNKETT, 18TH BARON (1878), Irish author and soldier, served in World War. Has pub. many works, including *Tents of the Arabs*, 1914; *A Night at an Inn*, 1916; *The Queen's Enemies*, 1921; *If Shakespeare Lived Today*, 1921.

DUNSINANE (56° 28′ N., 3° 17′ W.), peak of Sidlaws, Perthshire, Scotland; remains of 'Macbeth's castle.'

DUNSTABLE (51° 52′ N., 0° 32′ W.), market town, near Chiltern Hills, Bedfordshire, England; was a Rom. station; remains of church of Augustinian Priory (founded, 1131) now included in parish church; straw-plaiting. Pop. 10,000.

DUNSTAN, ST. (924-988), abbot of Glastonbury, 945; bp. of Worcester, then of London; abp. of Canterbury, 959.

DU PONT, SAMUEL FRANCIS (1803-65), rear-admiral; *b.* Bergen, N.J.; *d.* Philadelphia; son of Victor Marie du Pont de Nemours. In 1815 he entered the navy as a midshipman and saw service in the Mediterranean West Indies, Brazil, China, Japan, India and Arabia. He became a commander in 1842 and assisted in organizing the Naval Academy at Annapolis. In the Mexican War he commanded the Cyane, operating on the Californian coast, which he cleared of enemy craft, and seized San Diego, La Paz and Mazatlan. In the Civil War he commanded the South Atlantic blockading squadron, took Port Royal in cooperation with Sherman's land forces, and was promoted to rear-admiral. In 1863 he attempted to seize Charleston, S.C., but suffered defeat with serious loss, and he was relieved of his command. Du Pont Circle, Washington, D.C., centered by a statue of the admiral, was so named in his honor.

DU PONT, T(HOMAS) COLEMAN (1863), a United States senator, *b.* at Louisville, Ky., son of Antoine Bidermann and Ellen Susan Coleman Du Pont. He was educated at Urbana, O. University and at Mass. Inst. Tech. He was extensively engaged in coal and iron mining in Kentucky, and was at the head of many large interests including: president, E. I. Du Pont de Nemours Powder Co., Central Coal and Iron Co. and of the Wilmington Trust Co. In 1921 he was appointed a member of the U.S. Senate to fill the vacancy occasioned by the resignation of Hon. Josiah O. Wolcott.

DU PONT DE NEMOURS, PIERRE SAMUEL (1739-1817), Fr. statesman; served under Turgot; pres. of Constituent Assembly, 1790; afterwards on king's side; narrowly escaped execution; went to U.S., 1799; returned to France, 1802, finally to America, 1815.

DUPUIS, CHARLES FRANÇOIS (1742-1809), Fr. scientist, politician, and author; prof. of Rhetoric at Lisieux, 176., and prof. of Humanity in Collége de France, Paris, 1788; prominent part in politics of the Revolution.

DUPUY, CHARLES ALEXANDRE (1851-1923), Fr. statesman; premier and Minister of Interior, 1894; in office when Dreyfus was condemned; resigned, 1899.

DUPUY DE LOME, STANISLAS CHARLES HENRI LAURENT (1816-85), Fr. engineer and inventor; introduced building of iron ships into France, etc.

DUQUESNE, a borough of Allegheny co., Pennsylvania, 10 m. S.E. of Pittsburgh, on the Monongahela R., and on the Pennsylvania Railroad. It has steel works and blasting furnaces. Pop. 1920, 19,011.

DUQUESNE, ABRAHAM, MARQUIS (1610-88), Fr. naval officer; distinguished himself in wars with Spain; defeated combined Dutch and Span. fleets off Sicily, 1676; cr. marquis by Louis XIV.

DUQUOIN, a city of Illinois, in Perry co. It is on several important railroads and is the center of an extensive coal mining region. It has also many important industries. Pop. 1920, 7,280.

DURALUMIN, a light alloy composed of 94 per cent aluminum with varying percentages of copper and magnesium. Its specific gravity ranges from 2.77 to 2.84, and it possesses the strength and hardness of mild steel. Its melting point is about 650° C and it can be rolled, forged and drawn when hot or cold. Its composition is modified, somewhat, according to the purpose for which it is required, and its properties can also be changed by heat treatment, so as to make it susceptible to rolling and drawing or to render it hard. The metal withstands atmospheric influences and is suitable for construction purposes where lightness combined with strength is required. It is commonly used for the framework of airships.

DURA MATER. See Brain.

DURANCE (43° 46′ N., 5° 15′ E.), Fr. river; rises in Hautes-Alpes; falls into Rhône 3 miles S.W. Avignon; length, *c.* 220 m.; fierce current.

DURAND, E(DWARD) DANA (1871), statistician; *b.* Romeo, Mich. After graduating from Oberlin College in 1893, he studied at Cornell University, receiving the Ph. D. degree in 1896, and thereafter served for two years as legislative librarian of the New York State Library. Between 1898 and 1909 he was assistant professor of administration and finance at Leland Stanford Jr. University, Secretary of the United States Industrial Commission, instructor in economics at Harvard, U.S. census specialist on street-railways and electric-lighting plants, and special examiner and deputy commissioner of the Bureau of Corporations. From 1909 to 1913 he served as director of the U.S. Census and then joined the faculty of the University of Minnesota as professor of statistics and agricultural economics. He wrote on the finances of New York City, trusts, tabulation by mechanical means, political and municipal legislation, co-operative livestock shipping, taxation and statistics.

DURAND, RT. HON. SIR HENRY MORTIMER (1850), Brit. diplomat; was political secretary to Sir Frederick (afterwards Earl) Roberts during Kabul campaign, 1879; foreign secretary in India, 1884-94; envoy to Afghanistan, 1893; minister at Teheran, 1894-1900; consul-general at Madrid, 1900-3; and ambassador at Washington, 1903-6.

DURANGO, a city of Colorado, in La Plata co., of which it is the county seat. It is on the Denver and Rio Grande and the Rio Grande Southern railroads, and on the Las Animas River. It is the chief commercial center of southwestern Colorado and northwestern New Mexico. It is in an important mining region and has smelting and reduction works, as well as flour mills and packing plants. Pop. about 5,000.

DURANGO (24° N., 105° W.), state, N.W. Mexico; mountainous; climate dry and healthy; soil very fertile; few streams; chief minerals, gold and silver; wheat, tobacco, fruits. Area, 38,009 sq. miles. Pop. 438,000. The capital, Durango, has a cathedral; cotton and woolen factories. Pop. 35,000.

DURANT, a city of Oklahoma, in Bryan co., of which it is the county seat. It is on the Missouri, Oklahoma, and Gulf, the Missouri, Kansas and Texas, and the St. Louis and San Francisco railroads. It is the center of an important agricultural region and is the seat of a Presbyterian College and the Southeastern State Normal School. Its industries include flour mills and oil refineries. Pop. 1920, 7,340.

DURANT, HENRY FOWLE (1822-81), philanthropist, preacher and lawyer; *b.* Hanover, N.H., *d.* Wellesley, Mass. His name was originally Henry Welles Smith. Graduating from Harvard in 1842, he studied law and established a lucrative practice in Boston. He also acquired wealth in manufacturing and mining pursuits. Subsequently he abandoned his profession, and as a convert to Evangelicism became a lay preacher and devoted his energies to philanthropic objects. He was the founder of Wellesley College.

DURAZZO, seapt., Albania (41° 19′ N., 19° 27′ E.); anc. *Epidamnus* or *Dyrrachium*; scene of struggle between Pompey and Cæsar, 48 B.C.; held by Turks, 1501-1913; during World War was taken by Austrians, Feb. 27, 1916, prior to which the Italians held it to protect retreating Serbian forces; evacuation of Serbian, Montenegrin, and Essad Pasha's troops, along with many refugees, effected without mishaps; captured by Italians, Oct. 1918. Pop. 5,000.

DURBAN, PORT NATAL (29° 52′ S., 31° E.), chief seaport and largest town, Natal (*q.v.*); excellent harbor with projecting 'Bluff'; beautifully laid-out city, with fine town hall, parks, gardens, Victoria Embankment, and ocean beach; Berea, handsome suburb; much of Transvaal and Orange Free State imports and exports pass through Durban; shipping, coaling-port, preserves, whale and other fisheries; exports tea, sugar, coffee, maize, wool, hides, skins, angora hair, etc.; wireless station; fortified. Pop. 70,000 (32,000 white; many Indians).

D'URBAN, SIR BENJAMIN (1777-1849), Brit. soldier-administrator; entered army, 1777; fought in Peninsula, 1808; gov. of Antigua, 1824; gov. of Cape Colony, 1834-38; slavery abolished and Great Trek of Dutch farmers commenced, 1836; *Durban* in Natal named after him; held military command in Canada, 1847-49.

DURBAR, Indian state ceremonial; also name for native state council. D's were held at Delhi when Queen Victoria was proclaimed Empress, 1877; King Edward, Emperor, 1903; and King George V., Emperor, 1912.

DÜRER, ALBRECHT (1471-1528), Ger. artist and engraver; *b.* Nuremberg; *s.* of a goldsmith, to whose craft he was apprenticed. His apprenticeship ended in 1490, and until 1494 D. travelled about Germany to improve himself in his art. In later years he lived in Venice and the Netherlands, but the greater part of his working life was spent in Nuremberg. Amongst his most famous paintings are the *Feast of the Rosary, Adoration of the Magi, The Crucifixion, Madonna and Child, SS. John and Peter, SS. Paul and Mark*, and many portraits; his most famous copperplates include *St. Jerome in his Study*; *Knight, Death, and the Devil*; *Adam and Eve, Death's Coat-of-Arms*, besides numerous sets of woodcuts. His writings include *The Art of Mensuration, Treatise on Fortification*, and other scientific works. He ranks as the greatest of Ger. artists. His work as an engraver on copper and wood is no less distinguished, and has undoubtedly exercised a greater influence on later art than his painting.

DURESS, legal term for a plea of compulsion; means also illegal constraint or imprisonment.

DURFORT (44° 14′ N., 1° 7′ E.), village, Tarn-et-Garonne, France; was seat of ancient lordship.

DURHAM, a city of North Carolina, in Durham co. It is on the Southern Air Line, the Southern, and other railroads. It is the center of an important tobacco and cotton growing region and is famous for the manufactures of smoking tobacco. It is the seat of Trinity College. Durham was the scene of the treaty between General Sherman and General Johnston, representing the Union and Confederate armies, at the close of the Civil War. Pop. 1920, 21,719.

DURHAM (54° 46′ N., 1° 34′ W.), city, Durhamshire; Parliamentary and municipal borough. Cathedral (founded XI. cent.) is one of finest in England; built on site of church which enshrined St. Cuthbert's bones. Castle, erected by William the Conqueror, once occupied by Bishops of D., is now property of D. Manufactures include ironware, carpets, and mustard. Pop. 1921, 17,389.

DURHAM (54° 46′ N., 1° 45′ W.), maritime county, N. England; area, 1014 sq. miles; bounded N. by Northumberland, W. by Westmoreland and Cumberland, S. by Yorkshire, E. by North Sea. Chief industry is shipbuilding; extensive and important yards on Tyne. Manufactures include iron, glass, chemicals, salt and earthenware. Chief towns are Durham (county town), Sunderland, Stocton, S. Shields, E. and W. Hartlepools, Jarrow (important ship-building ports), Gateshead, and Darlington. Pop. 1921, 1,478,505.

DURHAM, JOHN GEORGE LAMBTON, 1ST EARL OF (1792-1840), Brit. statesman; became strong Radical; opposed Corn Tax and advocated parliamentary reform; cr. Baron D., 1828; intimate friend of the Duchess of Kent and Queen Victoria; went as ambassador to Russia in 1832, and again 1835-37; cr. Earl of D., 1837; Gov.-Gen. of Canada, 1838.

DURIS (*fl.* 300-275 B.C.), Gk. writer; *b.* Samos; athlete and for a time tyrant of Samos; wrote work on Gk. history from 371-281 B.C., and various treatises; an untrustworthy source of information.

DURLACH (48° 59′ N., 8° 29′ E.), town, grand-duchy of Baden, Germany; iron manufactures. Pop. 13,000.

DÜRNSTEIN (48° 24′ N., 15° 35′ E.), town, Austria; here Russians and Austrians defeated French, 1805.

DUROC, MICHEL GERARD CHRISTOPHE, DUKE OF FRIULI (1772-1813), a French soldier. He served as aide to Napoleon in the Italian and Egyptian campaigns and was made Grand Marshal in 1805. He took part in the great wars of Napoleon and also performed several diplomatic missions. He was one of Napoleon's favorite marshals. He was killed at the battle of Bautzen in 1813.

DURUY, JEAN VICTOR (1811-94), Fr. historian and educationist; Minister of Education, 1863-69; did much for educational reform, and wrote histories of Greece, Rome, and France.

DURYEA, a borough of Pennsylvania, in Luzerne co. It is on the Erie, the Lehigh Valley, and the Delaware, Lackawanna and Western railroads, and on the Lackawanna river. It is situated in an important coal mining region. It has also manufactures of silk. Pop. 1920, 7,776.

DUSE, ELEANORA (1859), Italian actress; *b.* Vigevano, Italy. She belonged to a theatrical family and first appeared on the stage as a child acting with wandering troupes and suffering the privations incidental to the precarious existence of itinerant companies. Her genius began to be recognized when she appeared at Naples in 1879 and in Milan a little later. Thenceforth she was acknowledged as Italy's greatest actress and one who also ranked with the best of her time. The roles in which she became distinguished embraced an extensive repertory and included plays of Dumas, Scribe, Zola, Ibsen, Sudermann, Goldoni, D'Annunzio, Pinero and Shakespeare. She was closely associated with the Italian poet, Gabrielle d'Annunzio, and a number of his most notable plays were written for her. She made an early marriage to an Italian actor and writer named Checchi, but the union did not last. In 1893 she played in New York City as Camille in Dumas' play of that name, and visited the United States again in 1902. Ill-health curtailed her work, causing her to live in retirement, and in her later years she seldom appeared on the stage.

DÜSSELDORF, tn., on Rhine, Rhineland, Germany (51° 14′ N., 6° 47′ E.); busy river port; has famous art academy, beautiful public gardens; manufactures iron, chemicals, pianos, cotton, paper, glass, etc.; attained height of prosperity in early 18th cent.; became Prussian possession, 1815; birthplace of Heine. During the World War was a munition centre; evacuated by Ger. troops in terms of Armistice, Dec. 1918; occupied by Belgians. Pop. 358,000.

DUST, earth or other matter reduced to very fine dry particles. We can observe its presence in the atmosphere by seeing a beam of light reflected by suspended motes each acting as a minute planet. D. is carried into the air by evaporation and air currents, and is, no doubt, largely due to physical causes, such as volcanic action, and also to artificial causes, of which the chief is the combustion of coal for commercial purposes.

DUTCH EAST INDIA COMPANY, THE, founded by charter, 1602, to protect Dutch trade, and also as a weapon in struggle with Spain and Portugal; governed by directorate of 60 members; it dealt principally with China and Japan, also with Malay Archipelago; founded settlement at Cape of Good Hope as half-way house to India; declined in XVIII. cent.; dissolved, 1798.

DUTCH EAST INDIES, Sumatra, part of Borneo, Java, and other E. India islands (6° N. to 11° S., 95° to 141° E.); capital, Batavia, Java; pop. 42,000,000; area, 740,000 sq. miles; export tobacco and spices; formerly property of Dutch East India Company, but since end of XVIII. cent. administered by crown officials. SEE MAP EAST INDIES.

DUTCH WEST INDIA COMPANY, THE, founded, 1621, for the purpose of colonization in American and African continents, to secure the supply of slave labor from Africa, and to plunder Span. and Portug. shipping.

DUTY, that which one ought, or is required by the moral law, to do.

DU VAIR GUILLAUME (1555-1621), Fr. political lawyer and writer; *b.* Paris; employed on mission to England, 1596; Keeper of the Seals, 1621; his writings, which influenced Fr. style, include *La Philosophie morale de Stoiques* and *De l'eloquence francaise.*

DUVAL, ALEXANDRE VINCENT PINEUX (1767-1842), Fr. actor and dramatist; elected to Academy, 1812.

DUVAL, CLAUDE (1643-70), Eng. highwayman; famed for his gallantry; hanged at Tyburn.

DU VERGIER DE HAURANNE, JEANE (1581-1643), Fr. ecclesiastic; pioneer of the Jansenist revival; author of *Petrus Aurelius.*

DUVEYRIER, HENRI (1840-92), Fr. explorer and geographer; explored Sahara, 1858-61.

DUX (50° 47′ N., 13° 44′ E.), town, Bohemia, Czecho-Slovakia; lignite mines; glass-works. Pop. 12,000.

DVINA, or **DWINA**, two rivers, Russia. (1) Northern Dvina has origin in two head-streams in Vologda (60° 42′ N., 46° 21′ E.); enters White Sea by wide estuary, 25 m. below Archangel; length *c.* 780 m., of which over 350 m. navigable; connected by canal with Neva and Volga. During World War the estuary was utilized by Allied vessels carrying stores and munitions to Russia; Archangel occupied by Allied force, Aug. 1918, which repulsed Bolshevists in May 1919; troops withdrawn at end of year. (2) Southern Dvina, or Düna, rises in Tver (56° 44′ N., 32° 24′ E.), flows S.W. to Vitebsk, then N.W. past Dvinsk to Gulf of Riga; length, *c.* 650 m.; small vessels ascend to Dvinsk; mouth frozen Dec. to March. During World War Lower Dvina proved a strong barrier against Ger. invasion and was not crossed till Aug. 1917; remained scene of fighting even after armistice of Nov. 1918. In Oct. 1919 Ger. troops attacked Riga, but were repulsed by Letts; in Jan. 1920 Letts and Poles captured Dvinsk from Bolshevists.

DVINSK, or **DÜNABURG**, fort. tn., on S. Dvina, Kurland (55° 53′ N., 26° 33′ E.); incorporated in Russia 1772; trades in linen, hemp, and wood; manufactures matches and nails; important strategic centre; assailed by Germans from Aug. 1915, but not captured till Feb. 1918; remained in hands of Bolshevists till Jan. 1920, when it was taken by Letts and Poles. Pop. 110,900.

DVORAK, ANTONIN (1841-1904), Bohemian composer; *b.* Mulhausen, Bohemia; *d.* Prague. In his youth he studied the violin, piano and organ and the theory of music and in 1862 became a violinist in a Prague theatre orchestra after some vicissitudes with small bands and as a cafe instrumentalist. Later he became church organist. He first became known as a composer by his comic opera, *The King and the Collier*, 1874, and his Slavonic Dances, 1878. His greatest success was achieved in his *Stabat Mater*, produced in England in 1883 after being rejected by the Austrian government. His cantata, *The Spectre's Bride*, sung in Birmingham, England, two years later, brought him a similar triumph. In 1892 he came to New York as director of the National Conservatory of Music and occupied the post for three years. While in America he wove Indian and negro melodies into his symphony *From the New World*, and the overture *In Nature*. His works included chamber music, symphonies, sacred compositions, operas, oratorios, pianoforte pieces and many songs. Austria made him a peer of the realm and he had many honors bestowed upon him by universities and musical organizations.

DWARF (or 'pygmy'), name given to small-statured adult human beings, still found in different parts of the world, notably in Central Africa. Amongst these may be named the African 'Bushmen,' and the Bambute tribes of Uganda, averaging about 4 ft. 7 in. in height. Famous dwarfs of history have been Jeffery Hudson, 1619-82, and 'General Tom Thumb,' *d.* 1883.

DWARFED TREES, common ornament in China and Japan; growth curtailed by placing them in shallow flower pots and preventing free flow of sap.

DWARKA (22° 14′ N., 69° 5′ E.), town, Kathiawar, Brit. India. Its sacred temple of Krishna is visited annually by many pilgrims.

DWARS (*c.* 26° 30′ N., 90° E.), tract of country, N.E. India; consists of two divisions, E. Dwars and W. Dwars; formerly part of Bhutan; ceded to British, 1865.

DWIGHT, JOHN (*d.* 1703), Eng. potter; pioneer of the industry in Eng.

DWIGHT, JOHN SULLIVAN (1813-93), Amer. musical critic.

DWIGHT, THEODORE WILLIAM (1822-1892), jurist and educator; *b.* Catskill, N.Y.; *d.* Clinton, N.Y. He graduated from Hamilton College, where he subsequently established a school of law and served as its professor. In 1858 he established the law school at Columbia College, administering it until 1891. Meantime he was professor of constitutional law at Cornell University and lecturer at Amherst College. He filled public offices as a member of the New York Constitutional Convention in 1867, and of the Commission of Appeal (a court created to relieve the congestion of the Court of Appeals); and was president of the New York Prison Association. He was an associate editor of the *American Law Register*, edited Maine's *Ancient Law*, and was the author of several works on legal subjects.

DWIGHT, TIMOTHY (1828-1916), University president; *b.* Norwich, Conn.; *d.* New Haven, Conn. He was a graduate and tutor at Yale University and studied theology there, as well as at Berlin and Bonn. He taught sacred literature and New Testament Greek at Yale and in 1861 became a full professor. In the same year he was ordained as a congregational minister. From 1886 to 1899 he was president of Yale, filling an office occupied by his grandfather, Timothy Dwight, from 1795 to 1817. He was succeeded by Arthur F. Hadley. During his tenure Yale became a university and greatly expanded its activities. He was a member of the American committee for the revision of the Bible, 1878-85, and an editor of the New Englander, later the Yale Review. His writings relate mainly to biblical and educational subjects.

DWIGHT, TIMOTHY WILLIAM (1752-1817), an American author and divine, graduated at Yale College, 1769, was a tutor there from 1771-77, and eighteen years later was appointed president of the college, when he proved his versatility by lecturing on a variety of subjects, and was able to influence a wide circle by the force of his virile personality. But those intervening years (1777-95) were busy ones. During the war of Independence he served as an army chaplain, and wrote *Columbia*, a fine battle song. For five years, 1778-83, he worked at Northampton, preaching, farming, and interesting himself in politics. During the twelve years following he had the charge of a Congregational church in Greenfield Hill, Connecticut, and also built up an excellent school. His books show a great diversity of interest. Southey believed that posterity would best esteem his *Travels in New England and New York* (4 vols.), 1821-22, because of the light they throw on contemporary social and economic conditions, but his sermons, entitled *Theology Explained and Defended* (5 vols.), 1819, enjoyed for many years a conspicuous popularity.

DYAKS, DAYAKS, wild native tribes of Borneo, notorious for head-hunting, though this custom is now said to be little practiced; skin reddish-brown, but other physical characteristics similar to the darker Malays; weapons are sword and spear, and they are very skilful in use of the blow-pipe; practice spinning, weaving, and other crafts, and possess considerable intelligence.

DYCE, ALEXANDER (1798-1869), Eng. dramatic editor and critic; edit. Shakespeare and other Elizabethan dramatists, and later Eng. poets.

DYCE, WILLIAM (1806-64), Scot. artist and etcher; R.A. 1848; *Descent of Venus, Bacchus, Madonna and Child,* etc.; typical examples in House of Lords, Tate Gallery, and at Edinburgh.

DYER, ALEXANDER BRYDIE (1817-1874), army officer; *b.* Richmond, Va. He graduated from West Point in 1837 and joined the artillery, serving in the Florida war in that and the following year. In the Mexican War he was promoted to captain for heroic conduct and in the Civil War attained the rank of brigadier-general, while serving as Chief of Ordnance. He became major general in 1865.

DYER, SIR EDWARD (*d.* 1607), Eng. courtier and poet; friend of Raleigh and Sidney; famed for pastoral verse.

DYER, THOMAS HENRY (1804-88), Eng. historian and antiquary; histories of Modern Europe, Athens, Rome, etc.

DYERSBURG, a city of Tennessee, in Dyer co., of which it is the county seat. It is on the Illinois Central, the Birmingham and Northwestern and on the Forked Deer River. It is surrounded by an important agricultural and cotton growing region and has a large trade in cotton, wheat and corn. Its industries include the manufacture of cottonseed oil, flour, lumber products, wagons, brick, tobacco, etc. Pop. 1920, 6,444.

DYES AND DYEING. The art of coloring fabrics has been practised from time immemorial. Cloth wrapped around Egyptian mummies has been found to be colored red, blue and other shades, and there are references to colored cloths in the early books of the Old Testament and in the works of ancient historians. A purple dye manufactured at Tyre, Tarsus and Alexandria from shell fish is believed to have been in use at least one thousand years before Christ.

The term 'dyeing' is frequently given a broad interpretation so as to include the coloring of textiles by all processes, but strictly speaking, it only includes those processes in which the cloth is immersed in a dye bath and then given sufficient time to absorb the coloring matter into its fibres. Dyes are divided into three main groups—Natural Organic Dyes, Mineral Dyes and Artificial Dyes. These again are subdivided into *direct dyes*, which are capable of coloring a material without the assistance of any other substance, and *mordant dyes*, which require an intermediate substance to fix or develop the color. Some coloring matters act as direct dyes towards one kind of fiber, but require a mordant with another kind. For instance, basic colors will dye wool direct, but require a mordant with cotton. Natural vegetable dyes are derived from leaves, stems, wood, bark, roots and fruits of plants and trees. Cochineal, which is sometimes included in this group, is not a vegetable dye, but is derived from the dried bodies of red insects, native to Mexico and Central America. Among the important vegetable dyes are the following:

Indigo, prepared from the leaves and stems of a herbaceous plant. The dye does not exist, as such, in the plant, but is developed by fermentation, followed by oxidation. The leaves and stems are soaked in water and allowed to ferment, when a clear yellow liquor is produced. On agitating this liquor in contact with air, insoluble indigo blue is produced. The dye is used for cotton and wool, but seldom for silk. The indigo is first reduced, either by fermentation or by chemicals, in an alkaline solution, *indigo white* being produced. The cloth is soaked in this solution and then exposed to the air, when indigo blue is again formed and deposited as an insoluble color in the fibers.

Logwood dye is formed by extracting wood from the tree known as haematoxylin campechianum, found in Central America and Jamaica. It is a mordant dye and is used in conjunction with metallic mordants, of which salts of chromium, aluminum, copper and iron are most generally used. It is used for the production of black silk, wool, and to a smaller extent, cotton.

Red Woods include Brazil, peach, Japan and Lima wood. They are all mordant dyes, and are used on cotton and wool. *Madder* is a root dye, now seldom used except in Oriental countries, as it has been replaced by artificial madder, made from alizarine. *Fustic, Quercitron, Osage Orange, Tumeric* and *Cutch* are other vegetable dyes of some importance, and give varying shades of yellow and brown.

The most important *mineral dyes* are Prussian blue, chrome yellow, chrome green, iron buff and khaki. They are all produced by precipitating a colored pigment upon the fiber.

The *artificial dyes* form by far the most important group of dyestuffs, and several hundred different products belonging to this class are available. These so-called coal-tar colors had their origin in the discovery of mauve by the English chemist Perkin, in 1856. Various methods are used in classifying this vast number of dyes, but the following arrangement in groups according to their behavior with various fibers is one most generally adopted.

Basic Colors, so called because they are basic in their chemical behavior, can be used as direct dyes on wool and silk, but require an acid mordant with cotton. They are, however, more widely used on cotton than on the other two fibers, tannic acid being commonly employed as the mordant. Basic dyes give brilliant rich colors, fast to washing, but not to light.

Acid Colors are chemically of an acid character, and are very widely used for dyeing wool, and to a somewhat smaller degree for silk. They are little used on cotton. The acid colors are very numerous and their properties vary greatly.

Phthalic Anhydride Colors include the eosins, and are widely used on silks for producing bright pinks.

Direct Cotton Colors as the name implies, have a direct affinity for cotton and other vegetable fibers and also color the animal fibers directly. They are seldom fast to washing.

Sulphur Colors bear a close relationship to the direct cotton colors, but they are much faster to washing, and light. They all contain sulphur and sodium sulphide is used in the dye-bath. For the most part, sulphur colors are of a dull character, and include blacks, browns, and the darker shades of blue, green and yellow.

Mordant Colors require the use of an additional substance to fix them upon cotton, wool and silk. The mordants most commonly used are salts of chromium, aluminum, iron, tin and copper. These are first deposited on the fiber, which is then washed and immersed in the dye bath. The solution is then gradually raised to the boil and maintained at that temperature for some time. The mordant colors are used mainly on wool. They are very fast to both light and washing.

Mordant Acid Colors can be used as direct dyes on wool, but are commonly employed in conjunction with metallic mordants, in which case they give colors extremely fast to light and washing.

Insoluble Azo Colors are produced directly upon the fiber. They are extensively used on cotton and are sometimes known as 'developed' colors because they are developed during the process of application.

Reduction Vat Colors are similar, in their mode of application to indigo. They are insoluble, but form soluble compounds when reduced in an alkaline solution. When exposed to air, the fabric saturated with the reduced solution is oxidized, the coloring matter being deposited in the fibers. They are very fast to both light and washing.

Miscellaneous Colors. The most important of the miscellaneous colors is aniline black, produced by the oxidation of aniline. It is extremely fast to light, bleaching and washing. See COAL TAR PRODUCTS.

DYES, ANILINE. See ANILINE DYES.

DYESTUFFS. See ANILINE DYES.

DYKE.—(1) Wall raised to prevent inundation; used in Holland, and in other low-lying lands. (2) (in Geology) A wall or slab of igneous rocks, always found in neighborhood of volcanic vent.

DYMOKE, name of Eng. family who have held office of King's Champion since reign of Richard II.

DYNAMICS, the science which deals with the motion and equilibrium of material bodies. It is subdivided into kinetics and statics, dealing respectively with the motion and equilibrium of material systems. Newton's laws of motion supply the foundation of the subject. These laws demand the recognition of mass and force. The preliminary subject of kinematics deals with the motions of points, lines, and surfaces without reference to mass or force.

Starting from the fundamental laws, it should be possible to find a solution for every problem which can be stated in dynamical terms. Certain derived principles are useful in solving certain types of problems (*e.g.*) D'Alembert's, by means of which every kinetic problem can be expressed as a statical problem; also the conservation of momentum and of movement of momentum, as well as the principles of energy.

The principle of the conservation of energy has brought about the dynamical treatment of subjects formerly excluded, such as heat in thermodynamics, electricity and magnetism in electro-dynamics; also hydrodynamics and aerodynamics, dealing with liquids and gases respectively

DYNAMITE, an explosive invented by Nobel; consists of a mixture of 25% Kieselguhr (mainly pure silica) with 75% nitroglycerine. All modifications consist of nitroglycerine and a substance capable of absorbing it.

DYNAMO. A dynamo is a machine which converts mechanical into electrical energy. It is based on the principle that a difference of potential and consequent current are created in a conducting circuit when the conductors forming the circuit cut the lines of force in a magnetic field. In an ideally simple dynamo a rectangular coil forming part of a circuit is rotated in a magnetic field between two poles in such a way as to cut the lines of force. A current is set up in the circuit, and the direction of this current changes each time the coil is at right angles to the magnetic lines, so that an alternating current results, and the dynamo is called an alternator. In a direct-current dynamo this induced alternating current is made continuous in the external circuit by the introduction of a device known as the commutator. Dynamos thus fall into two main classes —viz., continuous or direct-current (D.C.) dynamos, and alternators, or alternating-current (A.C.) dynamos.

D.C. Dynamos.—The essential parts of the D.C. dynamo are: the *field-magnets*, which product the magnetic field; the *armature*, which revolves between the poles of the field-magnets and carries coils of wire that cut the field twice in every revolution; the *commutator*, which renders the current continuous; and the *brushes*, which bear on the commutator pick up the current, and transmit it to the terminals of the machine.

The field-magnets are powerful electromagnets, and are generally excited by current drawn from the machine itself. A two-pole machine has one N. and one S. pole; a four-pole has two N. and two S. poles, arranged alternately; a multipolar has an even number of poles more than four, spaced equally and alternately around the armature. For large installations multipolars are usually required. The armature may be of the drum, ring, or disk type, according to its construction. The commonest form is the drum armature. It is composed of thin laminæ of soft iron, separated from each other by insulating material, and threaded on to a three or four armed 'spider,' keyed to the driving shaft. On the surface of the resulting cylinder are slots into which insulated coils are wound and fixed. The current is generated in these coils as the armature rotates. The commutator is a small cylinder on the driving shaft, but insulated from it, and formed of alternate segments of copper and insulating material. Each of the copper segments has the junction of two armature coils soldered to it. The brushes are made of hard carbon. They press upon the rotating commutator at those points where the greatest E.M.F. is developed, and collect the current for transmission to the external circuit.

D.C. dynamos are classified according to the method of exciting the field-magnets. In *series-wound* machines the armature coils, the field-magnets, and the external circuit are all connected in series. Thick wire and comparatively few turns are employed in winding the field-magnets in order that internal resistance and heating of the coils may be avoided. *Shunt-wound* machines have their field-magnets connected in parallel with the external circuit. The magnet coils thus act as a shunt across the terminals of the machine. In order that little current may be drawn off, many turns of comparatively fine wire offering high resistance are used. In large machines from 2 to 3 per cent. of the energy is used for excitation. Shunt-wound dynamos are well suited for charging accumulators, driving motors, and lighting. *Compound-wound* machines are a combination of the two previous types, being partly shunt-wound and partly series. The relative number of turns may be so devised that the voltage at the terminals of the machine is kept practically constant with varying current. Machines of this class are now very largely used.

Characteristics.—The working capacity of any dynamo under varying loads can be graphically exhibited by means of its characteristic curves, in which pressure is plotted against current for particular speeds. These curves are two in number —the external characteristic, which gives the relation between the terminal voltage of the machine and the field current, when the machine is run at constant speed and with no load on the external circuit; and the external characteristic which shows the relation between the terminal voltage of the machine at different loads, with rated field current and when run at constant speed. These curves show that in a series-wound machine as current increases voltage increases till it reaches a maximum, and then declines; in a shunt-wound machine voltage falls as current rises; and in a compound wound machine, the voltage may either increase, remain constant or decrease while the current (lead) increases, depending on the degree of compounding (the proportion of series-field turns to shunt-field turns). When the voltage increases the machine is said to be over-compounded; when the voltage is constant, the machine is flat-compounded (so called because its external characteristic is a straight horizontal line) and when the voltage decreases the machine is referred to as under-compounded. Some D.C. generators have small auxiliary poles placed midway between the main poles, whose purpose is to reduce the sparking at the brushes at varying loads. These are called interpoles or commutating poles.

Alternators or *A.C. Dynamos* differ from D.C. dynamos in that they have no commutator. The rotating part of the machine, which may be either the field-magnets or the armature, is known as the *rotor*; the stationary part as the *stator*. In large alternators the armature is ring-shaped, fixed and laminated like that of the D.C. machine; the field-magnets are carried on a fly-wheel revolving within the armature, have their poles, N. and S. alternately, arranged radially round the circumference, and are *separately excited* by a separate direct current supplied from brushes through sliprings on the shaft.

Alternators are classified as single-phase, two-phase, and three-phase machines. In a single-phase alternator the armature coils are connected in series. The armature of a two-phase alternator carries two independent sets of coils, arranged alternately around the armature, so that when the pressure in one set is maximum the pressure in the other is zero. For a complete period or wave of pressure the voltage in the one set lags 90° behind that of the other—technically the phase difference is 90°. In the three-phase machines there are three windings, and at any given moment the pressure in these is relatively at 0° in the first, 120° in the second, and 240° in the third, the phase difference here being 120°. Two and three phase alternators are the types commonly used in large installations, for the reason that two and three phase motors have a greater starting torque than single phase ones, even when the latter are specially wound to be self-starting. Where the power is to be transmitted some distance, three phase machine are chosen because of the great efficiency of the three phase transmission system.

In modern electrical engineering work alternators are largely used along with transformers in the transmission of energy over long distances at high pressures, especially when the source of energy is water-power situated far from the locality in which the current is to be applied.

DYNAMOS, ARMATURE OF. See ARMATURES.

DYNAMOMETER, an instrument for measuring force or power. Mechanical d's are of two kinds—*absorption* and *transmission* d's. In the former a known force in the form of a brake is applied to a wheel rotated by the engine whose power is to be measured. In the latter, the power, after being measured, is transmitted for use.

DYSENTERY, an infectious disease, characterized by ulceration of the large intestine, with diarrhœa and the passage of blood and mucus, occurring in marshy and malarial districts. Somewhat different types are due to different organisms, the *amoeba hystolytica*, and two differing *bacilli dysenterioe*, and infection is supposed to be generally from drinking contaminated water. The onset of the disease is usually sudden, with griping pain, and frequent discharges from the bowel. An attack often lasts only a week, but it may become chronic.

DYSON, CHARLES WILSON (1861), a United States naval officer, *b.* at Cambridge, Md. He graduated from the United States Naval Academy in 1883 and afterwards served on various duties and stations including: on board the San Francisco, Spanish-American War, 1898 and on the Oregon, 1904-5, was fleet engineer of the Asiatic Fleet, 1905-6, duty Bureau of Steam Engring, Navy Dept., 1906-13, inspector of machinery at Camden, N.J. from 1913-14 and in 1914 was placed in charge of the design of naval machinery, Bureau of Engring. After advancing through various grades he was made a rear-admiral in 1917.

DYSPEPSIA, INDIGESTION, general term applied when the digestive organs, especially the stomach, are unable properly to perform their function of digesting the food, and thereby cause various disagreeable symptoms. D. may be due to derangement of the organs themselves, or to faults of the person affected. Under the former head may be classed weakness of the digestive organs after fevers, etc.; deficiency of the digestive juices of the stomach, of the pancreas, or of the liver; or, a frequent cause, bad teeth. Under the latter come intemperance in eating or drinking, or both; swallowing the food hurriedly without chewing it properly; drinking too much, or too often, tea, coffee, alcohol; insufficient exercise, or hard mental or physical work immediately after food; worry and mental strain; unclean, but not actually decayed, teeth.

The symptoms experienced usually include loss of appetite, headache, giddiness, a feeling of fulness or discomfort or dull pain in the chest after food, flatulence, nausea, and vomiting, but only one or two of these may be present.

E

E, fifth letter of Eng. alphabet, having various long and short sounds; occasionally sounded as *a* (clerk); final *e* is now usually mute, but was originally sounded.

EA, water-deity, associated, in the religion of Babylon, with the Persian Gulf.

EADBALD, king of Kent; *s* of Æthelberht; reigned, 616-40.

EADMER (*c.* 1064-1124), Eng. historian; Benedictine monk; sec. and biographer of St. Anselm.

EADS, JAMES BUCHANAN (1820-1887) American engineer; *b.* Lawrenceburg, Ind. He worked as a clerk in St. Louis, and in 1839 was employed on Mississippi River steamers. His inventive ability, demonstrated by devices for the raising of sunken vessels, led to his being called on by the Federal Government at the beginning of the Civil War to construct ironclad steamers for use on the Mississippi and tributary streams. He constructed eight in a hundred days, and built many more in the course of the conflict. His name is identified with the great arch bridge that he built over the Mississippi at St. Louis 1867-74 and with the improvement of the South Pass of the Mississippi delta 1975-79. He was the first American to receive the Albert Medal of the Society of Arts 1884.

EAGLE, a fierce and extremely powerful bird of prey, of strong flight and keen vision; the 'king of birds.' The rest, or *eyrie*, is generally built on precipitous crags, and consists of a large mass of sticks and heather lined with fur and wool. The e. feeds on game, lambs, and the like, but does not, however, refuse fresh carrion. Unless molested, it seldom attacks mankind. About half a dozen other varieties are found in America and Europe, including the imperial eagle.

The e. was an emblem of Jove, and so became the symbol of Roman sovereignty. The German imperial e. is one-headed, and its claws are outstretched; the Austrian is two-headed, and it grasps a sword and sceptre in the right claw, an orb in the other; the Russian, likewise two-headed, carries only the sceptre and orb. The United States have adopted a one-headed eagle holding arrows and an olive branch.

EAGLE, the name given to a gold coin of the value of ten dollars, in United States currency. The first coinage was made in 1795. There are also half eagles, quarter eagles, and double eagles, bearing the values which their names indicate.

EAGLE ISLAND (54° 17′ N., 10° 5′ W.), island, Mayo, Ireland. Eagle Islands are dependencies of Mauritius; also called Trois Frères.

EAGLEHAWK (36° 50′ S., 144° 20′ E.), town, Victoria, Australia; gold mines. Pop. 8000.

EAGLE PASS, a city of Texas, in Maverick Co., of which it is the county seat. It is on the Mexican International, and the Southern Pacific railroads, and on the Rio Grande River. The surrounding region has coal mines, and important agricultural and stock raising industries. The city has a large trade in cattle, hides and wool, and does a large business with Mexico. It is port of entry. The public buildings include handsome Federal buildings. Pop. 1920, 5,765.

EAKINS, THOMAS (1844-1916), Amer. artist; portraits and genre pictures.

EAMES, EMMA (1867), Amer. soprano prima donna; studied under Marchesi in Paris and made successful début at the Grand Opera as Juliette and at Covent Garden, London 1891 sang regularly in opera both in England and in U. S. until 1911; in 1891 married Julian Story, the portrait painter, from whom she was divorced. She married Emilio de Gogorza, an eminent baritone singer in 1911.

EAR, the organ of hearing, is divided in man into external. middle, and internal ear. The *external ear* consists of two parts, the *auricle*, or *pinna*, a fibrocartilaginous framework covered with skin, the purpose of which is to catch the vibrations of the air, and the *auditory meatus*, a bony and in part cartilaginous canal passing into the temporal bone and ending at the *tympanic membrane*, which separates it from the middle ear. The auditory meatus is lined with skin, the glands of which secrete wax. The *middle ear*, or cavity of the tympanum, is a small cavity situated in the petrous portion of the temporal bone, the purpose of which is to transmit to the internal ear the sounds which strike the tympanic membrane. It is filled with air (from back of nasal cavity through *Eustachian tube*), so as to preserve uniform temperature, to increase action of the sound conveyers, and to keep pressure equal on each side of the tympanic membrane.

Between the middle ear and the internal ear are two fine membranes covering little openings called the *fenestra rotunda* and the *fenestra ovalis*; and the vibrations caused by sounds are transmitted from the tympanic membrane to the membrane of the fenestra ovalis, and thus propagated to the internal ear, by a chain of little bones in the middle ear, called from their shapes the *malleus*, *incus*, and *stapes* (*i. e.*, hammer, anvil, and stirrup).

The *internal ear* is composed of a series of cavities in the petrous portion of the temporal bone, comprising the *vestibule*, the central cavity, into the superior part of which open three canals, named from their shape the *semi-circular canals*, while the front part of the vestibule is prolonged into a spiral canal resembling the shell of a common snail, the *cochlea*. A spiral bony shelf divides the cochlea incompletely into two passages: an upper, or *scala vestibuli*, and a lower, or *scala tympani*. Within the bony cavities is contained a series of membranous canals which closely follow them in shape, but, being much smaller in calibre, are not in close contact with their walls. Between the walls of the two series of canals is a space filled with a special fluid, the *perilymph*, while the membranous canals are filled with another fluid, the *endolymph*.

In the vestibule the membranous labyrinth is divided into a small sac, the *saccule*, into which the membranous canal of the cochlea opens, the *utricle*, into which the membranous semi-circular canals open, and a slender blind canal, the *endolymphatic duct*. The membranous semicircular canals are only about a quarter-width of the corresponding bony canals, and at one end of each is a large dilatation, or *ampulla*, into which the hairs of hair-cells project. The membranous cochlea, or *cochlear duct*, lies in the bony canal between the free edge of the bony shelf and the outer wall, and along its base extends a minute structure, the *organ of Corti*, the essential part of which consists of hair-cells projecting into the endolymph.

Physiology of the Ear.—When vibrations of a body set up air-waves (which cause the sensation called sound) they are reflected by the external ear and pass into the auditory meatus, and strike the tympanic membrane. The vibrations are transmitted by the chain of ossicles, and, the base of the stapes being attached to the membrane of the fenestra ovalis, are then transferred to the perilymph. The waves in the perilymph set up corresponding waves in the endolymph, and these effect the nerve endings to the different parts. The utricle and saccule can only perceive sounds as sounds, the analysis of tone is the function of the cochlea, its hair-cells being irritated by the waves of endolymph, and the sensation communicated to the brain by their fine nerve filaments. The function of the semicircular canals is concerned with the sense of equilibrium, the hair-cells of the ampullae being irritated by the waves of endolymph caused by change of position.

Diseases of the Ear may affect either the external, middle, or internal ear. The auditory meatus may be impacted with wax (the commonest cause of temporary deafness), the products of inflammation, etc., or the tympanic membrane may be thickened, have adhesions, be the subject of other diseases, or suffer from wounds caused by violence. Another common cause of deafness is the closure of the Eustachian tube at its opening into the upper part of the throat. A serious and common cause of pain in the ear is inflammation, suppurative or not, of the tympanic cavity (middle ear). This often has a discharge coming from it, and its seriousness is due to its proximity to the brain, to which inflammation may extend and cause death. As soon as possible the ear should be syringed out with a mild antiseptic solution, and the external meatus plugged with cotton wool to dry up the moisture.

Foreign bodies in the ear can usually be removed by syringing with warm water or by dropping in warm glycerine. See DEAF AND DUMB, Care of.

EARL (Dan. *jarl*), Eng. title, corresponding to foreign count, one of five ranks of Eng. peerage. Anglo-Saxon earls were more like vassal kings, and in Norman times earldoms were powerful and extensive.

EARL, JOHN ARTHUR, (1866), an American college president, *b.* at Bathvale, Scotland, *s.* of John and Mary Gallagher Earl. He came to the United

States in 1883 and was educated at Des Moines (Ia.) College and at the Rochester Theological Seminary. He was ordained in the Baptist ministry in 1887 and was afterwards pastor at Guthrie Center, Ia., Pilot Mound, Ia., Greece, N. Y., First Church, Waterloo, Ia., and the Belden Avenue Church, Chicago. In 1911 he became president of Des Moines College which position he resigned in 1921 to become pastor of the First Church, at St. Paul, Minn.

EARLE, ALICE MORSE (1853-1911) American author; *b.* Worcester, Mass. She was thoroughly familiar with the history of the colonial period in New York and New England and most of her voluminous writings were based on the life and customs of that time. Her publications include *Customs and Fashions In Old New England*, 1893; *Colonial Dames and Goodwives*, 1895; *Curious Punishments of Bygone Times*, 1897; *Stage Coach and Tavern Days*, 1900; *Old Time Gardens*; *Sun Dials and Roses of Yesterday*, 1903; and *Two Centuries of Costume In America*, 1903.

EARLE, FRANKLIN SUMNER, (1856), an American botanist and agriculturist, *b.* at Dwight, Ill., *s.* of Parker and Melanie Tracy Earle. After studying in the schools at Cobden, Ill., he became a student at the University of Illinois, and later took special courses in botany and biology at the Alabama Poly. Inst. In 1886 he became connected with special mycol. work and was afterwards connected with various universities and experimental stations and with the U. S. Dept. of Agriculture, by whom he was sent to P. R. in 1918 to investigate serious sugar cane disease. He became president of the Cuba Fruit Exchange in 1911—. Author of '*Southern Agriculture.*'

EARLE, RALPH, (1874), a U. S. naval officer, *b.* at Worcester, Mass., *s.* of Stephen Carpenter and Mary Eaton Brown Earle. He graduated from the U. S. Naval Academy in 1896 and after serving on various duties and stations, including service during the Spanish-American War, and after advancing through various grades, was made chief of the Bureau of Ordnance with the rank of rear-admiral in 1916. In 1919 he was given command of the U.S.S. Connecticut with the rank of captain and in 1921 was made chief of staff of control force, U.S.S. Florida. He originated many ordnance projects including the 14-inch railway batteries in France and directed making a type of mine entirely new to naval warfare.

EARLHAM COLLEGE, educational institution near Richmond, Ind., under Quaker auspices, founded in 1847. The college, which is coeducational, has eight buildings on grounds of 120 acres, valued at about $400,000. It has a library of 15,000 volumes and its endowment is about $750,000. In 1923 the enrollment of students was 485 and there were 32 members of the faculty.

EARLY, JUBAL ANDERSON (1816-1894) American military commander; *b.* Franklin Co., Va. He graduated at West Point Military Academy in 1837 and saw his first service in the Seminole War 1837-1838, at the conclusion of which he resigned from the army and entered on the practice of law at Rocky Mount, Va. He held various State and legislative offices up to the outbreak of the Mexican war, in which he served as major of volunteers. Though opposed to secession, he joined the Confederate army when his State seceded, and by brilliant service at Williamsburg, Second Bull Run and Antietam rose to the rank of brigadier general. He was in command of a division at Gettysburg and in 1864 was placed at the head of the army that invaded Maryland. He won a victory over Lew Wallace at Monocacy Junction and threatened the national capital, from which he was however driven back. The duel between him and Sheridan for the control of the Shenandoah Valley was one of the epics of the war. Both were dashing leaders with many military qualities in common. In September of 1864, Sheridan defeated him twice within three days, at Opequon Creek on the 19th and Fisher's Hill one the 22nd. On Oct. 19th in a surprise attack at Cedar Creek, Early fell on the Federal forces and drove them before him, and it was only the opportune arrival of Sheridan from Winchester that turned the rout into a Union victory. In the following Spring, Early was defeated by Custer at Waynesborough, and was shortly afterward removed from his command. Following the war, from which he retired with the rank of lieutenant general, he practised law in Virginia.

EARN (56° 23′ N., 4° 11′ W.), loch, Perthshire, Scotland; drained by river EARN, which, issuing from E. end, flows E. and enters Firth of Tay; course, 40 miles.

EAR-RING, pendent ornament to hang from the lobe of the ear, used both by savage and civilised races, and, in some countries, by both sexes. The use is of great antiquity, and there is reference to these ornaments in *Genesis*.

EARTH. The earth is the third planet from the sun, round which it revolves in 365.26 days, and it also rotates about its own axis once in every 23 hrs. 56 min. 4.09 secs. It is a globe poised in space.

Aristotle was the first to teach that the earth was spherical, and his arguments were similar to those used at the present time—viz., all heavenly bodies are round; the shadow of the earth on the moon during an eclipse is round; the appearance of the sky at night varies when viewed from different parts of the earth's surface; the masts of ships appearing and disappearing on the horizon are first and last to be seen. It was not, however, until the world had been circumnavigated that its spherical form was firmly established.

The exact determination of the earth's size and shape is one of the most brilliant achievements of applied mathematical science, and is of the utmost value in astron., where a number of measurements can only be expressed in terms of the earth's radius. The earth is not a perfect sphere. It is slightly flattened at the poles, and bulges at the equator, the lengths of the equatorial and polar diameters being 7925·6 and 7899·14 miles respectively. In shape it is, therefore,an *oblate spheroid*—that is, the figure produced by the revolution of an ellipse about its shorter axis. But the deformation is so small that it is only revealed by careful measurements and observations. If the earth were a true sphere which did not rotate, the force of gravity would be the same at all places on its surface. The centrifugal force can be calculated, and gravity at any place can be determined from the length and time of swing of a simple pendulum. Biot, in 1808, was the first to make such observations, which have since been repeated by many others. These observations prove that places at high latitudes are nearer the centre of the earth than those on the equator.

Further evidence of the earth's ellipticity is supplied by careful measurements of the planets, which reveal a similar flattening at the poles—a result proved mathematically to be entirely due to rotation about an axis, and depending on the speed with which it is accomplished. The planet Jupiter serves as an illustration of this, the difference between the polar and equatorial diameters being immediately apparent without any refined measurements. The time of rotation of Jupiter is under 10 hours. The *precession* on the earth's axis is also only explicable on the ground that the earth is elliptical. As the means of observation and measurement become more and more refined, greater precision in our knowledge of the earth's figure and size is obtained.

EARTHENWARE, See Pottery.

EARTH-NUT, root-stock of *Conopodium denudatum*, an umbelliferous European plant; about size of chestnut; edible.

EARTHQUAKE, see Seismology.

EARTHWORM, small regularly segmented invertebrate, devoid of specialised sense organs, which feeds on the decaying vegetable matter in soils, this being effectively turned over and broken up in the process.

EARWIG (*Forficula auricularia*), a brownish insect, abundant in gardens, characterised by possession of a pair of pincer-like processes at posterior end of body; name derived from *supposed* habit of creeping into ears of sleeping persons.

EASDALE (56° 17′ N., 5° 39′ W.), island, near Oban, Scotland; has slate quarries.

EASLEY, RALPH MONTGOMERY (1858) American educator and publicist; *b.* Schuyler Co., Ill. He received a public school education; taught school at Hutchinson,Kans. 1877-78; was editor and proprietor of the Hutchinson News 1883-91, during five years of that time being postmaster of the town. He was connected with the Chicago Inter-Ocean for three years in its department of political economy; later he organized and acted as secretary of the Chicago Civic Federation. He took an active part in conferences on primary election reform, on the foreign policy of the United States, on trusts, taxation and immigration 1898-1905. He organized in 1917 and was a director of the League For National Unity. He has written extensively on economic and sociological topics, and is editor of the National Civic Federation Review, 1923.

EASEMENT, legal term meaning the use of, or benefit in, land or property, without proprietorship.

EAST, SIR ALFRED (1849-1913), Eng. landscape artist and etcher; A.R.A. 1882; Pres. R.B.A. 1906.

EAST AFRICA, British. See British East Africa.

EAST AFRICA, CONQUEST OF. The outbreak of the Great War found the Germans in E. Africa ready not merely to offer resistance to invasion of their territory, but to undertake offensive operations against the neighbouring Brit. possessions. Their military and police forces combined comprised 3,500 whites and 16,000 natives. The Ger. plan of campaign provided for invasions of Nyasaland, N. E. Rhodesia, and the British shores of Victoria Nyanza, but aimed especially at an advance against Mombasa and the Uganda railway. The Brit. forces at first were not sufficient even for defence, but volunteer units were formed, and, later, reinforcements came from India. The Brit. light cruisers *Astroea* and *Pegasus* destroyed the Ger. wireless station shortly after war broke out, but *Pegasus* was disabled at Zanzibar by the Ger. cruiser *Konigsberg* Sept. 20, 1914, and the Brit. blockade of the coast was not established till Feb. 1915. After the failure of the Ger. attack along the coast towards Mombasa, a Brit. expeditionary force from India attempted a landing at Tanga Nov. 4, which proved so costly that it was given up. Meantime the Ger. force directed against the shores of Victoria Nyanza and Uganda had fared badly. It occupied Karungu, but was prevented from advancing to the terminus of the Uganda railway at Kisimu. and the Brit. steamer *Winifred* disabled the Ger. craft *Muanza* March 6, 1915. On Lake Nyasa the Brit. armed steamer *Gwendolen* attacked the Ger. post of Sphinxhaven and made prisoners of the crew of the Ger. vessel *Hedwig von Wissmann* Aug. 1915.

Two powerful launches were sent out from Eng. *Mimi* and *Touton*, as they were called, accounted for the Ger. *Kingani* and *Hedwig von Wissmann* July 1915. At the same time the Ger. cruiser *Konigsberg*, which had been bottled up in the Rufiji R. since October, was attacked by the monitors *Severn* and *Mersey*, and destroyed, although the Germans salved its guns July 11.

At the beginning of 1916 the Ger. colony was still intact. In the autumn General Smuts undertook the task. The enemy held a strong position on the N. frontier in the gap between Mt. Kilimanjaro and the Pare Hills, but by a flanking movement from the N. W. Smuts succeeded in forcing the Germans out of Taveta.

Smuts now determined to drive the Germans from the Nguru hills. He tried to intercept them by sending Brits. on a detour to Mdondo by the N., so as to intercept the main Ger. force, but the tracks proved to be impassable, and the enemy escaped southwards.

Meantime a Brit. column had moved out from Bagamoyo along the Ruwu R., while another, with the aid of the fleet, secured the surrender of Dar-es-Salaam Sept. 3, and subsequently the whole coastal region was cleared. After a period of reorganization, the offensive was renewed on New Year's Day, 1917. At this stage Smuts was summoned to London, and the command was assigned to Hoskins. At the end of May the command devolved on van Deventer, and the general plan was to prevent union between von Lettow and the force under Tafel, which had formed the garrison of Tabora. The latter was caught N. of the Rovuma R., and surrendered unconditionally Nov. 28. Von Lettow was driven from the Matandu R. and hastened to the Rovuma, where small Port. forces were unable to hold him back Nov. 25. In Oct. he made an incursion into Rhodesia, appeared before Abercorn, but was driven S. towards Kasama, which he was compelled to evacuate just before the Armistice in Europe Nov. 11, in compliance with which he laid down his arms Nov. 28, 1918, to General Edwards at Abercorn.

EAST AFRICA PROTECTORATE. See British East Africa.

EAST ANGLIA, kindgom of Anglo-Saxon England; probably founded early in VI. cent.; converted to Christianity VII. cent.; Sigeberht was a famous king; under Mercian supremacy till 825, when Egbert of Wessex was acknowledged lord.

EASTBOURNE (50° 46′ N., 0° 17′ E.), watering-place, on Eng. Channel, Sussex, England. Pop. 1921, 62,030.

EAST CHICAGO, a city of Indiana, in Lake Co. It is on the Wabash, Pennsylvania, Pere Marquette, Baltimore and Ohio, the Chicago Terminal, and other railroads. The city is on the shore of Lake Michigan and has an excellent harbor. Its shipping facilities have been improved by the construction of the canal which connects the harbor with the Calumet River. Its industries include the manufacture of iron and steel products, cement, boilers and chemical and foundry products. Pop. 1920, 19,098.

EAST CLEVELAND, a city of Ohio, in Cuyahoga Co. It forms a residential suburb of Cleveland. The city contains the laboratory of the National Electric Lamp Association. Pop. 1920 27,292.

EAST CONEMAUGH, a borough of Pennsylvania, in Cambria co. It is on the Pennsylvania Railroad and on the Conemaugh River. It is an important steel manufacturing city and has large railroad shops. The borough was partially destroyed in 1889 by the famous Johnstown flood. Pop. 1920, 5,256.

EASTER, annual festival commemorating Christ's resurrection; falls about the time of the vernal equinox, *i. e.* the next Sunday following the first full moon of the calendar on or after March 21; forms the opening of the ecclesiastical year. In England method of computing the date was fixed by a synod held at Whitby 664. Previous to this time E. had been kept according to an earlier method of computation, which was rejected by the Western and retained by the Eastern Church. In 664, however, Britain adopted the practice of the Western Church. The name is derived from a Saxon goddess (Eastre) whose festival occurred about the same tine, synchronising with a festival kept in classical times. The eating of 'hot-cross' buns on Good Friday is a survival of an ancient custom of making special 'Easter cakes' for the festival.

EASTER ISLAND OR RAPA NUI, volcanic isl., Pacific Ocean (27° 8′ S., 109° 17′ W.), 2,000 m. from coast of S. America; area, 55 sq. m.; discovered by Dutch; annexed by Chile 1888; pop. 250 (of Polynesian stock): chief features: great platform of stone near sea-shore; huge stone images (14-16 ft. high; some nearly 40 ft.); ruins of stone houses with wooden tablets incised with hieroglyphics in an unknown tongue.

EASTERN QUESTION. The *Near Eastern Question* is the name given to the problem of what is to become of that portion of Eastern Europe until recently under the authority of the Turks. The question from time to time was rendered acute by Russia's claim to be the protector of the Christian populations in that area, as also by her aim to be regarded as the heir to the 'Sick Man' of Europe. In the 19th cent. first Greece became independent, then Rumania, Serbia, Montenegro, and Bulgaria. The Turk. revolutions of 1908 and 1909 seemed to promise reforms, but the 'Young Turks' proved as tyrannical as their predecessors. In 1912 matters reached a crisis between Turkey and the Balkan states. As a result of the wars of the Balkan League a fresh settlement was made, and the Turk. dominions in Europe were further contracted. The Great Powers had stood aloof, but Austria, the tool of Germany, was under suspicion of scheming to gain predominant influence in the Balkans, and the tension of the situation was only temporarily allayed till the outbreak of the Great War brought about a universal upheaval. The treaty with Turkey May 1920 ostensibly settled the Near Eastern Question by reducing Turkey in Europe to Constantinople and the environs up to the Chatalja lines and the area of Lake Derkos. In Asia Minor Greece received the Smyrna and Aidin districts; Palestine, Syria, and Mesopotamia became mandate territories; Armenia and the Hejaz were made independent; and the 'autonomy' of Kurdistan was sanctioned. By the terms of the treaty (see TURKEY) her army and navy were practically extinguished; she could not raise taxes, frame a Budget, sanction expenditure, or grant concessions; all financial arrangements were vested in a commission, on which she has only a consultative voice.

This treaty, however, was never signed by Turkey, and the victories won by the Turkish Nationalist Army over Greece in Asia Minor in 1922 brought about an entirely new condition. Turkey demanded possession of the territory taken from her by the Treaty of Sevres, possession of Constantinople, and other conditions. A conference was held at Lausanne in January and February, 1923, between Turkey and the European powers. By the treaty there signed all Turkey's demands were practically granted. See LAUSANNE CONFERENCE; TURKEY.

The *Far Eastern Question* has reference primarily to the decay of China and the rise of Japan. The opposition of Russia, France, and Germany prevented Japan from securing large cessions of Chin. territory, but in 1897-8 leases of certain strategic areas were obtained by Germany, Russia and Britain. A complete transformation was brought about by the alliance concluded between Britain and Japan in 1902, and subsequently renewed. After the Great War Japan remained in possession of the former Ger. base at Kiaochow, and obtained the mandate for ex-Ger. Pacific islands N. of the equator.

Questions relating to the Far East were among those considered at the Conference for the Limitation of Armaments, held in Washington in 1921-2. As a result of this conference Japan made concessions to China including the return of Shantung, and the other powers signed a treaty which placed China's position in a much more favorable situation than before. See CHINA; CONFERENCE ON THE LIMITATION OF ARMAMENTS.

EAST HAM (51° 32′ N., 0° 3′ E.), town, Essex, England. E. suburb of London. Pop. 1921, 143,304.

EASTHAMPTON, a city of Massachusetts, in Hampshire co. It is on the New York, New Haven and Hartford, and the Boston and Maine railroads. Within its limits are included three villages. It has important industries including a dyeing plant and plants for the manufacture of rubber goods, buttons, cotton goods, felt yarn, etc. It is the seat of Williston Seminary and it has a handsome public library and other public buildings. Pop. 1920, 11,261.

EAST HARTFORD, a city of Connecticut, in Hartford co. It is on the New York, New Haven and Hartford Railroad and on the Connecticut River. Its industries include the growing of tobacco, paper making, and market gardening. There are also large railroad and machine shops. The town has a public library and the Raymond Library. Pop. 1920, 11,648.

EAST INDIA COMPANY (popularly known as 'John Company') was founded in Eng. in 1600. Its sphere included both what is now called India and the East Indies. Its activities soon became confined in India, and the foundations of Brit. Imperial power were laid. Its power was consolidated and brought more under control of the Government in 1773. It became political rather than commercial, and was abolished when Ind. Government was taken over by Crown in 1858.

EAST INDIES, OR MALAY ARCHIPELAGO, the double chain of islands which extend from the S. E. corner of Asia to the N. extremity of Australia (11° S.-18° 45′ N., 95° 15′-150° 40′ E.). On the Pacific side are the islands of Borneo, Celebes, Buton, Sula Islands, Buru, Morotai, Jilolo or Halmahera, Amboia, Ceram, Banda, Waigeu, Misol, Salwati, and New Guinea. The Sulu Islands and the Philippines are a northward extension of this chain, the connecting links being the Sangir and Talaut groups of islands. Next the Indian Ocean the S. chain includes Sumatra, Riouw-Lingga, Banca, Billiton, Java, Madura, Bali, Lombok, Sumbawa, Sandalwood, Flores, Timor, and the Tenimber, Kei, and Aru groups. All these belong to the Netherlands, except the Philippines and Sulu Islands, the N. part of Borneo, the E. half of Timor, and the E. portions of New Guinea. Several of the islands (*e. g.*, Java, Sumatra) are studded with active volcanoes. The entire archipelago seems to represent the surviving fragments of an anc. land connection between Asia and Australia, the evidence for this view being especially strong in Borneo and Celebes. The inhabitants are mostly of the Malay race; though Chinese, Arabs, indigenous tribes, and various Europeans are also present. As these islands lie on each side of the equator, their climate is naturally hot; and it is also moist, for they fall within the influence of the monsoons. Consequently their products are of a tropical character—spices, fruits, coffee, sugar, cacao, indigo, tobacco, bamboos, etc. Pop. 37,800.

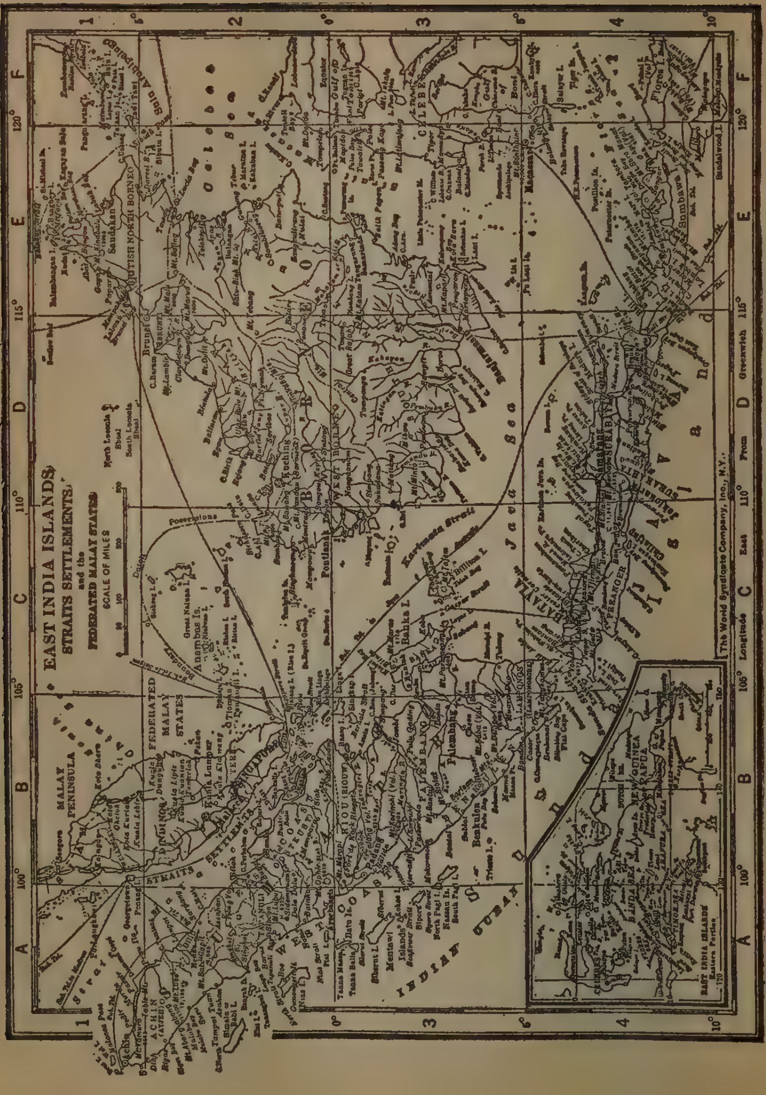
EASTLAKE, SIR CHARLES LOCK (1793-1865), Eng. artist; Pres. R.A. 1850; Director of National Gallery; subjects various; wrote several books on art.

EAST LIVERPOOL, a city of Ohio, in Columbiana co. It is on the Pennsylvania, the Youngstown and Ohio railroads, and on the Ohio River, 45 miles west of Pittsburgh, Pa. It is connected by steamers with all important Ohio River ports. Its industries include the manufacture of china, porcelain, earthenware, glass and terra cotta. It has also foundries and machine shops. There is a public library, business college, banks, newspapers, etc. Pop. 1920, 21,411.

EAST LONDON (32° 59′ S., 27° 52′ E.), important seaport town, Cape Province, S. Africa. Pop. 1921, 34,591 (including 17,592 whites).

EASTMAN, CHARLES ALEXANDER (Ohiyesa) (1858) American physician and author; *b.* Redwood Falls, Minn. His father was a full blood Sioux Indian and his mother a half-breed of the same tribe. He graduated at Dartmouth in 1887 and three years later from the Boston University School of Medicine. He was a government physician among his own people at the Pine Ridge agency 1890-93, Indian secretary of the Y.M.C.A 1894-97, and for the next three years looked after Indian interests at Washington. He had lectured widely on Indian topics and since 1915 has had charge with his wife, Elaine Goodale Eastman, the poetess, of a camp for girls founded by him at Munsonville, N. H. Among his publications are *Red Hunters and the Animal People*, 1904; *Wigwam Evenings*, 1909; *The Soul of the Indian*, 1911; *Indian Scout Talks*, 1914; *The Indian Today*, 1915; *From the Deep Woods to Civilization*, 1916; *Indian Heroes and Great Chieftains*, 1918 and in collaboration with his wife, *Indian Legends Retold*, 1919.

EASTMAN, ELAINE GOODALE (1863) American author; *b.* Washington, Mass. She was educated at home under private tutors, and in 1891 married Dr. Charles A. Eastman (*q.v.*) She has contributed many poems and articles to magazines and sometimes alone and again in collaboration with her sister has written novels and volumes of verse. Her publications include (with her sister) *Apple Blossoms*, 1878; *In Berkshire with the Wild Flowers*, 1879; *All Round the Year*, 1880; (alone) *Litle Brother O' Dreams*, 1910; *Yellow Star*, 1911; and (in conjunction with her husband) *Wigwam Evenings*, 1909; *Indian Legends Retold*, 1919. She directs


EAST INDIA ISLANDS,
STRAITS SETTLEMENTS,
and the
FEDERATED MALAY STATES
SCALE OF MILES
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MALAY PENINSULA
FEDERATED MALAY STATES
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SINGAPORE
Kuala Lumpur
Penang
Georgetown
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Sandakan
Brunei
BORNEO
WEST BORNEO
Kuching
Pontianak
CELEBES
Macassar
Java Sea
BATAVIA
SURABAYA
JAVA
Sumbawa
Flores
Bali
Lombok
SUMATRA
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Anambas Is.
Natuna Is.
Mentawi Islands
Nias I.
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Sulu Archipelago
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Camp Oahe for girls at Munsonville, N.H.

EASTMAN, GEORGE (1854), an American inventor and manufacturer, *b.* at Waterville, N. Y., *s.* of George W. and Maria Kilbourne Eastman. He was educated at Rochester, N. Y. While an amateur photographer and experimenter he succeeded in perfecting a process for making dry plates and began to manufacture them on a small scale in 1880. He later invented the kodak and became the leading manufacturer of kodaks and of motion picture films. He was president and general manager of the Eastman Kodak Co., Rochester, N. Y., president of the Eastman Kodak Co. of New Jersey and managing director of the Kodak Co., Ltd., London.

EASTMAN, REBECCA LANE HOOPER (MRS. WILLIAM FRANKLIN EASTMAN), (1877), an American authoress, *b.* at Walpole, N. H., *d.* of Franklin William and Martha Smart Holden Hooper. She was educated at Adelphi Academy, Brooklyn, at Radcliffe and at Columbia. Married William F. Eastman of New York City in 1912. She was a professional producer of plays for six years, was publicity manager, N. Y. City, for Radcliffe $3,000,000. endowment fund from 1921-22 and later director of the department of philology, Brooklyn Inst. of Arts and Sciences. In addition to short stories contributed to magazines she was the author of '*The Big Little Person*' in 1918.

EAST MOLINE, a city of Illinois, in Rock Island co. It is on the Chicago, Milwaukee and St. Paul, the Chicago, Rock Island and Pacific, the Chicago, Burlington and Quincy, and other railroads. It has manufactures of great importance, including the making of automobiles, agricultural implements, gas engines, iron goods, iron products, cement blocks, etc. Pop. 1920, 8,675.

EASTON, a city of Massachusetts, in Bristol co. It is on the New York, New Haven and Hartford Railroads. Within its limits are included several villages. It is an important manufacturing place and has plants for the making of shovels, foundry products, wire goods, automobiles, etc. There is a handsome park, a library, and a number of beautiful public buildings which were gifts of the Ames family. Pop. 1920, 5,041.

EASTON, a city of Pennsylvania, in Northampton co., of which it is the county seat. It is on the Lehigh Valley, the Pennsylvania, the Lehigh and Hudson and the Lackawanna railroads, and on the Delaware and Lehigh rivers and the Delaware, Morris and Lehigh canals. It has excellent water power which furnishes power for its important industries. It has also good shipping facilities on the rivers. Its chief industries are the manufacture of railroad supplies, chemical products, hosiery, machine pumps, stoves, blast furnaces, woolen goods, etc. It also contains the shops of the Lehigh Valley Railroad. The city is connected by electric railways with Bethlehem and Allentown. It has a public library, several homes for women and children, and is the seat of Lafayette College. Pop. 1920, 33,813.

EASTON, FLORENCE, (MRS. FRANCIS MACLENNAN), a prima donna soprano, *b.* at Middlesbro, Yorkshire, Eng., *d.* of J. T. Easton. She removed with her parents to Toronto, Can., at the age of 5 and after studying the piano made her appearance as a concert pianist when 10. Six years later she returned to England and studied voice in London where she made her debut and later studied in Paris after which she toured the United States with her husband, Francis Maclennan, sang in the Royal Opera House, Berlin, also in Hamburg, was with the Chicago Opera Association for two seasons and in 1917 became a prima donna at the Metropolitan Opera House, N. Y.

EAST ORANGE, a city of New Jersey, in Essex co. It is on the Lackawanna and Erie Railroad, and is 12 miles west of New York City. It is a favorite place of residence for persons doing business in New York, Newark, and other large cities. The streets are well laid out and paved. There are more than 60 miles of macaddam road. The city contains many handsome private residences, churches, a public library, and an excellent school system. It was chartered as a city in 1899. Pop. 1920, 50,710.

EAST PALESTINE, a village of Ohio, in Columbiana co. It is on the Pittsburgh, Fort Wayne and Chicago railroads. It has important industries including the manufacture of pottery, tile and terra cotta. It has a large rubber factory and machine shops. In the neighborhood are important coal mines. Pop. 1920, 5,750.

EAST PITTSBURGH, a borough of Pennsylvania in Allegheny co. It is on the Pennsylvania, the Bessemer and Lake Erie, and the Union railroads. The city has many important manufacturing establishments including the factories of the Westinghouse Electric and Machine Company. There are also plants for the making of meters, machines, steel rails and furnaces. Pop. 1920, 6,527.

EAST POINT, a city of Georgia, in Fulton co. It is on the Central of Georgia, and the Atlantic and West Point railroads. It has important industries including oil mills, fertilizer factories, saw and planing mills, iron works, cotton works, etc. Pop. 1920, 5,241.

EASTPORT, a city of Maine, in Washington co. It is situated on Moose Island, in Passamaquoddy Bay, into which empties the St. Croix River which is the natural boundary between the United States and Canada. It is on the Washington County Railroad, and is 190 miles northeast of Portland. It is the most northeasterly city in the United States. Eastport has an excellent harbor and has steamship connection with Boston, Portland and other cities. Fishing is its chief industry and it is famous for its sardine packing establishments. It was formerly a notable shipbuilding center. There is a public library, excellent public schools, banks, newspapers, etc. Pop. 1920, 4494.

EAST PROVIDENCE, a town of Rhode Island, in Providence co. It is on the New York, New Haven and Hartford Railroad, and on the Seekong River, by which it is separated from Providence. It is an important industrial community and has manufactures of chemical products, electrical products, and wire. Pop. 1920, 21,793.

EAST PRUSSIA, prov., Prussia (54° N., 21° E.), formerly enclosed by Baltic Sea, Russia and Russian Poland and W. Prussia, but by the Treaty of Versailles 1919 its boundaries have been contracted. The N.E. corner about Memel is ceded to the Associated Powers; the S. and E. frontiers facing the new Poland are to be fixed by plebiscites in the regency of Allenstein and in the area comprising the circle of Stuhm and Rosenberg, and the parts of the circles of Marienberg and Marienwerder E. of the Vistula; on the W. the boundary is formed by Poland and the free territory of Danzig. E. Prussia is guaranteed access to the Vistula and into Germany. Surface generally low, except in the S., which is traversed by a plateau, containing numerous small lakes; soil fertile; amber found; leading industry, agriculture; horse breeding; cap. Konigsberg. In the early weeks of the Great War the Russian armies overran the greater part of the prov., spreading panic amongst the inhabitants, but were signally defeated at Tannenberg Aug. 30, 1914 and Masurian Lakes, Sept. 13, and driven headlong across the frontier. In Nov. the Russians again began to advance into the prov., but as the result of winter fighting in Masuria Feb.-Mar. 1915 were finally compelled to retire. Pop. 1919, 2,229,290.

EAST RIVER, a body of water separating New York City on its eastern side from Long Island, Brooklyn and Queens boroughs, and connecting Long Island Sound with upper New York Bay. It is not a river, but a strait, about 16 miles in length and from a thousand yards to three miles in width. Powerful tides sweep through its narrower portions, giving it all the appearance of a rapidly flowing river. At one time it was extremely dangerous to shipping, on account of the submerged rocks in that narrow portion known as Hell Gate, where the current assumed all the aspects of a rapids at certain time. Most of these rocks have within recent years been removed by blasting and the channel dredged, but even now it is considered a dangerous point for passing vessels. Within the waters of East River are Blackwell's, Randall's, Ward's, Riker's and North Brother Islands. It is spanned by several large bridges; the old Brooklyn, the Williamsburg, Queensboro, Manhattan and the Hell Gate bridges.

EAST RUTHERFORD, a borough of New Jersey, in Bergen co. It is on the Erie Railroad. It is a favorite residential place for business men from New York. It has industries which include the making of cotton, linen bleaching works, and a steam boiler factory. Pop, 1920, 5,463.

EAST ST. LOUIS, a city in Illinois, in St. Clair co. It is on the Baltimore and Ohio, the Illinois Central, the Burlington and Quincy, and many other railroads, and is on the Missouri River opposite St. Louis, Mo., with which it is connected by a steel bridge. The city has passenger and freight steamer service with all important river ports. Here are the St. Louis national stock yards, one of the largest in the United States. Its other industries include rolling mills, glass works, machine shops, grain elevators, and a plant for the making of pneumatic tools, baking powder, locomotives, fertilizers, etc. East St. Louis is the largest horse and mule market in the world and was especially important during the World War. There are excellent schools, a public library, and daily and weekly newspapers. Pop. 1920, 58,547.

EAST YOUNGSTOWN, a village of Ohio, in Mahoning co. It is on the Baltimore and Ohio Railroad, and on the Mahoning River. Its chief industry is the manufacture of iron products. Pop. 11,237.

EATON, CHARLES AUBREY (1868), American clergyman; *b.* Nova Scotia, Canada. He graduated from Acadia University in 1890 and from Newton Theological Seminary, Mass., in 1893. He entered the Baptist ministry in the latter year and has held pastorates at Natick, Mass., 1893-95; Toronto, Can. 1895-1901; Cleveland, O., 1901-09; and New York City 1909-19. He became associate editor of Leslie's Weekly in 1919. During the greater part of his ministry he was also connected as editor or correspondent with several American and foreign newspapers. During the World War he was head of the national service department of the U. S. Shipping Board Emergency Fleet Corporation 1918-19. His publications include *For Troubled Hearts*, 1899; *The Old Evangel*, 1900.

EATON, CHARLES WARREN (1857) American artist; born Albany, N. Y. He pursued art studies at the National Academy of Design, the Art Students League, N. Y., and later in London and Paris. He exhibited his work at the Paris Exposition of 1900 and at the Pan-American Exposition of 1901. At the St. Louis Exposition in 1904 he received a silver medal, and for three years in succession 1901-03 carried off awards at the Salmagundi Exhibitions. He won a gold medal at the Paris Salon 1906 and a silver medal at Buenos Aires 1910. He has made a specialty of landscape work. Among his best known paintings are October's Tints, Connecticut Pines, Forest Lands 1911, The Valley of Sunset 1912, Gathering Mists 1913.

EATON, EDWARD DWIGHT (1851), an American college president, *b.* at Lancaster, Wisc., *s.* of Rev. Samuel W. and Catherine E. Demarest Eaton. He was educated at Beloit College, Yale University and at Leipzig and Heidelberg Univs. He was ordained as a Congl. minister in 1876 and was afterwards pastor of several churches including the Cleveland Park Church Washington, 1918-20. He was president of Beloit College from 1886-1905 and again from, 1907-17 and president emeritus 1917. He also spent one year in China to inspect missions of A.B.C.F.M. there, was an occasional lecturer and edited The Hymnal of Praise in 1913.

EATON, DORMAN BRIDGMAN (1823-99), Amer. lawyer; wrote on legal subjects and Civil Service reform.

EATON, THEOPHILUS (*d.* 1658), Eng. colonist; one of founders, and first gov. of New Haven, Mass. 1638.

EATON, WALTER PRICHARD (1878), American journalist and author; *b.* Malden, Mass. He graduated at Harvard in 1900 and entered newspaper work as a reporter on the Boston Journal. He was connected with the dramatic department of the New York Tribune 1902-07 and for two years 1907-08 was dramatic critic on the New York Sun. From 1909 to 1918 he was dramatic critic of the American Magazine. His publications include *Boy Scouts of Berkshire*, 1912; *The Man Who Found Christmas*, 1913; *Boy Scouts of the Wildcat Patrol*, 1915; *Plays and Players*, 1916; *Green Trails and Upland Pastures*, 1917; *Echoes and Realities*, verse 1918; *In Berkshire Fields*, 1919; and *On the Edge of the Wilderness*, 1920. He has also lectured widely on dramatic subjects. In 1923 he was an instructor in the Columbia University School of Journalism.

EATON, WILLIAM (1784-1811), Amer. soldier; consul to Tunis, 1790; led expedition in Tripoli in 1905; took Derna.

EATON, WYATT (1849-1896) Amer. painter. *B.* in Phillipsburg, Que., of American parentage in 1849. At an early age he moved to New York where he studied art at the National Academy, and later at the Beaux Arts, Paris, and under Gerome. His early work shows the influence of Millet with whom he was for some time associated. His models were later the old masters. He excelled in portraits. Among the most notable are Mrs. Richard Watson Gilder, W. C. McDonald, and Timothy Cole. He was a founder, and 1st secretary of the Society of American Artists. Among his important paintings are 'Harvesters at Rest' 1876, (Smith College), and 'Harvest Scene' and 'Reverie' in the Montreal Gallery.

EAU CLAIRE, a city of Wisconsin, in Eau Claire co., of which it is the county seat. It is on the Chicago and Northwestern, the Chicago and St. Paul and other railroads, and at the mouth of the Eau Claire River, and at the head of navigation of the Chippewa River. The city is a commercial center for the northwestern part of Wisconsin and is the outlet for a large lumber district. It has extensive water power which is used in its industries, which include the manufacture of iron, linen goods, furniture, paper, steel doors and shoes. The city is a well known summer resort. It has the Sacred Heart Hospital, public library, high school, banks, and daily and weekly newspapers. Pop. 1920, 20,880.

EAU-DE-COLOGNE, scent; first made by Farina, an Ital. perfumer, at Cologne, during XVIII. cent.

EAUX-BONNES (42° 59′ N., 0° 24′ W.), watering-place, Basses-Pyrénées, France; mineral springs.

EBBW VALE (52° 46′ N., 3° 11′ W.), urban district, Monmouthshire, Eng.; coal, iron, steel. Pop. 31,000.

EBERHARD I. (1445-96), first duke of Württemberg; made pilgrimage to Jerusalem; founded Tubingen Univ.

EBERLE, EDWARD WALTER (1864) a U. S. naval officer, *b.* at Denton, Texas, *s.* of Joseph and Mary Eberle. He graduated from the United States Naval Academy in 1885 and afterwards served on various duties and stations including service during the Spanish-American War, also during the Philippine Insurrection, commanded several U. S. ships and from 1915-19 was supt. of the U. S. Naval Academy. After advancing through various ranks he was made a rear-admiral in 1918 and during 1921-22 was commander in chief of the Pacific Fleet with the rank of admiral.

EBERS, GEORG MORITZ (1837-98), Ger. Egyptologist; wrote many novels which gave, in popular form, the results of his researches.

EBERSWALDE (52° 50′ N., 13° 48′ E.), town, Germany, Pruss. province of Brandenburg; ironworks, nail-making. Pop. 26,000.

EBERT, FREDERICH (1872), first president of the Ger. republic after the abdication of William II. in 1918; *s.* of a tailor; became a saddler and disciple of Bebel; ed. Socialist newspaper *Burgerzeitung* 1897; in 1907 elected to the central directorate of the Ger. Social Democratic party and to the Reichstag in 1912; throughout the Great War he was a leading member, in company with Scheidemann, Haase, Bernstein, and others, of the Majority Socialist party. He remained president of the republic in spite of all efforts to disrupt the government. See GERMANY.

EBINGEN (48° 12′ N., 9° 2′ E.), town, Württemberg, Germany; cotton and wool. Pop. 12,000.

EBIONITES (Hebrew *Ebhyon*, poor), name given to early sect of Jewish Christians believing in Christ as Messiah but not in Incarnation; observed Jewish law, some trying to force it on all Christians.

EBOLI (40° 37′ N., 15° 4′ E.), town, Campania, Italy; ancient *Eburum*. Pop. 9,500.

EBONY, the hard, black heart-wood of certain species of *Diospyros*, notably *D. reticulata*, found in Mauritius, and *D. Ebenum*, found in Ceylon.

EBORACUM, Rom. name of York.

EBRO (40° 43′ N., 0° 53′ E.), river, N. E. Spain; rises in Cantabrian mountains; flows with southerly course for 440 miles, and enters Mediterranean below Tortosa; navigable for *c.* 180 miles; ancient *Iberus.*

ÉCARTÉ, card game played by two persons with thirty-two cards, the small cards, two to six (inclusive), being removed from pack. Five cards are given to each player, and the eleventh turned up for trumps. King ranks highest, and the others in order are queen, knave, ace. The scoring is for king and the greater number of tricks, the game being five up.

ECBATANA (34° 46′ N., 48° 30′ E.), supposed ancient capital of Media, at foot of Mt. Orontes (now *Elvena*); summer residence of Persian and Parthian kings.

ECCE HOMO (Lat., 'Behold the Man'), the title given to pictures representing Christ crowned with thorns. One, by Correggio, hangs in the National Gallery, London, and one of the best known of such pictures is a Titian of 1543, which is to be seen in the Imperial Gallery at Vienna.

ECCELINO DA ROMANO, EZZELINO, (1194-1259), Ghibelline leader; served under Frederick II.; excommunicated for great cruelties; figures in Dante's *Inferno.*

ECCENTRIC, a device to produce a reciprocating motion from a rotary one; is used also to actuate the valves of engines, etc. It is a small crank. In detail, a disc carries the crank-shaft at some distance from its centre. This disc or 'sheave' is made in two pieces to embrace the crank shaft, and the pieces are held together by a steel clip or strap. The centre of the disc moves round the shaft on a circular path.

ECCLESFIELD (53° 22′ N., 1° 28′ W.), town, W. Riding, Yorkshire, Eng.; cutlery. Pop. 23,000.

ECCLES (53° 28′ N., 2° 21′ W.), extensive suburb, Manchester, Eng.; cotton mills. Pop. 1921, 44,237.

ECCLESIA (Gk. *ekklesia* = assembly), name given to the ancient Athenian assembly. It was given certain powers by Solon's legislation, but their exact nature is uncertain. Probably the *Thetes* were admitted to it, and it elected *Eupatrid*, magistrates. Its powers were increased later. Any Athenian over eighteen could be elected to it. From the IV. cent. onwards members received payment.

ECCLESIASTES, or the 'Preacher,' one of the books of the Wisdom lit. of the Old Testament. Its leading idea is expressed in the words, 'Vanity of vanities—all is vanity.' The authorship is quite and the date somewhat uncertain, though undoubtedly late—probably B. C. 250-200. Some place it as late as Herod the Great. It cannot be earlier than the late Persian period. Its composite nature has been asserted by some critics—though on insufficient grounds. The style is unclassical, and words and constructions appear which are frequent in Aramaic and the Mishnah

ECCLESIASTICAL. The Gk. word *ekklesia* used to mean generally the assembly of freeborn citizens, and in the Septuagint the assembly of Israel was used by Christ to designate the visible society of His own foundation, whence the term 'ecclesiastical' has come to describe something which is connected with or bears upon the Church.

ECCLESIASTICAL LAW, that body of law dealing with the Church in relation to the State, or in its internal government. The Canon Law of the Rom. Church is much more elaborate than that of Anglican or Prot. Churches, and can only be controlled by the State so far as is allowed by the Church itself. The Eng. Church is governed by Parliament, Convocation possessing little real power. The non-established churches only come under the law if they contravene it, or so far as they hold property.

ECCLESIASTICUS, (Gk. verisons, the *Wisdom of Jesus, S. of Sirach*) is in Old Testament Apocrypha (but accepted as canonical by the R. C. Church); consists of a number of religious and ethical sayings; tone is individualistic, moral rather than spiritual, and has no hope of immortality; exact date is uncertain, probably about 180 B.C.; was written originally in Hebrew, but for long only known in Gk. and other versions.

ECGBERT (*c.* 802-39), king of West Saxons.

ECGBERT, ECGBERHT (*d.* 766), abp. of York, 735; successor of Paulinus.

ECGFRITH (*c.* 671-85), king of Northumbria; killed in battle with Picts.

ECHEGARAY Y EIZAGUIRRE, JOSÉ (1833-1916), Spanish dramatist, mathematician, engineer, and politician. The author of several scientific works, he was until his death prof. of maths. at Madrid. He was a member of revolutionary cabinet in 1868, and after restoration of Bourbons 1874 was minister of finance. From this period dates the commencement of his dramatic career, with *El Libro Talonario*, culminating in his great masterpiece *El Gran Galeoto* 1881. In 1905 he was awarded Nobel prize for literature.

ECHIDNA, PORCUPINE ANT-EATER, egg-laying mammal of order *Monotremata*; common e. (*Echidna aculeata*) is found in Australia, Tasmania, and in New Guinea, where the three-toed e. (*Proechidna*) is also found. They are spiny and roll into a ball when attacked; the tongue is long and sticky, and is thrust into ant-nests.

ECHINODERMATA (Gk. *echinos*, a hedgehog; *derma*, the skin), PRICKLY-SKINNED ANIMALS; the diverse marine animals, Starfishes, Brittle Stars, Sea Lilies, Sea Urchins, and Sea Cucumbers, are ranged together in this group or *phylum*. They possess a radially symmetrical body and a skeleton of limy plates or rods, evident in the vast majority as projecting prickles or spines. These characters are so distinct that Echinoderms are unlikely to be confounded with any other kind of animal. But they have other characters in common, of which three are very apparent. Their habit of life is sluggish, for the Sea Lilies are generally fixed to rocks or stones, and the other members lie at ease or creep slowly on the sea-floor. Their movement is accomplished by means of sucker-or tube-feet (an external expression of a peculiar and characteristic 'water-vascular' system), which may be modified, as in Brittle Stars and Sea Lilies, to act mainly as organs of sense, respiration, or food-catching. Lastly, most have an extraordinary power of regenerating lost parts—Starfishes and Brittle Stars can lose and re-grow arm after arm, Sea Cucumbers and Sea Lilies can, on occasion, eviscerate themselves and replace the lost by new organs.

ECHINUS, sea-urchin; in arch. rounded moulding of capital in Doric column.

ECHMIADZIN, ITSMIADSIN, monastery in Russ. Transcaucasia, founded (traditionally) by Gregory the Illuminator, 302; has a valuable library of Armenian literature.

ECHO (classical myth.), mountain nymph, one of the Oreades, who pined for love of Narcissus, till only her voice was left.

ECIJA (37° 32′ N., 5° 9′ W.), town, on

Genil, Seville, Spain; ancient *Astigi*; textiles and shoes. Pop, 25,000.

ECK, JOHANN MAIER (1486-1543), Ger. theologian; *b.* at Eck; app. prof. at Ingolstad, 1510; one of the ablest Catholic apologists; replied to Luther's theses in his *Obelisci*; disputed with Luther, 1519; *Enchiridion locorum communium*; disputed also with Zwingli, and helped to draw up reply to Augsburg Confession, 1530.

ECKERMANN, JOHANN PETER (1792-1854), Ger. poet; friend of Goethe; wrote *Conversations with Goethe*.

ECKHART, JOHANNES (*c.* 1260 to *c.* 1327), Ger. Dominican theologian and preacher; called a 'speculative mystic'; follower of Aristotle and speculative theologian.

ECKMÜHL, EGGMÜHL (48° 52′ N., 12° 11′ E.), village, Bavaria; Austrians defeated by French, 1809.

ECLECTICISM, term for any system in philosophy or theol. which is composed out of several others. Taking ideas from opposing schools may be sometimes advantageous, but owing to tendency to gloss over fundamental differences by confusion of thought, E. is sometimes spoken of contemptuously. Later Gk. philosophy specially was eclectic.

ECLECTIC SCHOOL OF MEDICINE a branch of American medicine originating in a reform movement that began in 1825. The new school opposed the older practice of bleeding, blistering, and other drastic remedies and urged the adoption of milder measures and the use of vegetable medicines. It denounced the methods of the old school as cruel and inhuman and its remedies barbaric. The eclectic school rejects mercury and most other substances in medicine and makes use of native medicinal plants. The school's adherents, like the ancient Eclectics scout hard and fast rules, and seek the most effective remedies and treatments in medical cases from all sources. The first eclectic clinic and established in New York in 1825, was schools and colleges later came into being in other cities of the country. The school's modern practice, having developed from the early formative stage and the study of plant remedies, is based on specific medication, or specific remedies for specific conditions of disease on the principle that a fixed relationship exists between drugs and disease. Remedies do not become specific for certain pathological conditions until demonstrated by long experimentation. The leading college for teaching the practice is the Eclectic Medical Institute at Cincinnati, O. Practitioners number about 8,000 and have an organization in the National Eclectic Medical Association, which meets annually in selected cities.

ECLIPTIC, great circle of the celestial sphere.

ECLIPSE. When one heavenly body enters the shadow of another it is said to suffer an eclipse. With a large source of light like the sun, the shadow cast by a smaller body such as the earth or the moon consists of a long, conical shadow (*umbra*) where no light at all (apart from light refracted by the atmosphere) reaches, and a partial shadow (*penumbra*) surrounding the former. An eclipse of the moon can obviously only occur when the moon is in opposition—*i.e.*, at the time of full moon. Similarly, an eclipse of the sun can only occur when the moon is in, or nearly in, conjunction—*i.e.*, at the time of new moon. But since the moon's orbit is inclined to the ecliptic about 5°, an eclipse of the sun is impossible unless conjunction of the sun and moon takes place within about 16° of one of the nodes of the moon's orbit. The corresponding limit for a lunar eclipse is about 11°. Eclipses of the sun may be *total*, *partial*, or *annular*. Total eclipses can only be seen at places within the umbra of the moon's shadow, but as this is only about 236,000 m. long, and the mean distance of the moon is about 238,000 m., total eclipses, when such occur, can only be visible over a small portion of the earth's surface. When the umbra does not reach the earth, as when the moon is near apogee, an annular eclipse is visible at places in line with the point of the shadow. In a total lunar eclipse the whole of the moon enters the umbra of the earth's shadow, and may then frequently be seen shining with a reddish coppery light, due to light from the sun being refracted by the earth's atmosphere only the longer red rays being transmitted. In a partial lunar eclipse only a portion of the moon enters the umbra. Successive eclipses occur at regular intervals. The eclipse year consists of 346·62 days, being the time occupied by the sun in travelling from either node back to the same. Nineteen eclipse years are almost exactly equal to 223 synodic months, and constitute the cycle called 'Saros' by the Chaldeans. Much of our knowledge of the sun has been obtained from observations only possible during total eclipses. Thus a few seconds before totality, the red light of the chromosphere is seen; and during totality observations of the prominences, the 'reversing layer,' and the corona have yielded much information. The total solar eclipse of May 29, 1919, was remarkable for observations which are said to have overthrown the axiomatic basis of physical thought. It was observed by expeditions at Sobral in N. Brazil, and on the isl. of Principe off the W. coast of Africa. Photographs taken of a number of bright stars in the vicinity of the obscured sun showed a deflection in close accordance with that predicted by Einstein, as opposed to half that amount according to the principles of Newton. In 1923 there were two eclipses of the sun and two of the moon. A total eclipse of the sun occured on Sept. 10. For the doctrine that the dimensions of space hitherto believed absolute are relative and shifting, see RELATIVITY.

ECLOGITE, green and red rocks, consisting of omphacite and garnet or of smaragdite and garnet.

ECOLOGY, the study of the adjustment and response of plants and plant communities to various environmental factors, those being on the one hand climatic or geographical and atmospheric and on the other edaphic—that is, concerned with soil characters. Warming has recently classified the atmospheric (*a*) and edaphic factors (*b*) as follows: (*a*) light, temperature, atmospheric humidity and precipitations, movements of the air; (*b*) the nutrient substratum, its constitution, structure, air, water, temperature, dimensions and nutriment, the kinds of soil, the problem as to the chemical or physical action of soil. Under the influence of these and certain other factors plants fall into thirteen ecological classes, viz.: *Hydrophytes*, purely aquatic including plankton and marine floras, and the submerged vegetation of lakes, etc.; *Helophytes*, marsh formations, including tropical swamps; *Oxylophytes*, on acid soils such as peat; *Psychrophytes*, on cold soils such as tundras; *Halophytes*, saline soil formations; *Lithophytes*, rock formations such as lichens; *Psammophytes*, formations of sand dunes and the like; *Chersophytes*, waste land formations; *Eremophytes*, desert and steppe formations; *Psilophytes*, savannas; *Sclerophyllous* formations, Mediterranean maqui, karroo; *Coniferous forests*; *Mesophytes*, meadow and forest of temperate climes living under average conditions without great extremes.

ECONOMIC ASSOCIATION, AMERICAN, a society of teachers of economics and others interested in economics, founded in 1885. It holds a general membership meeting every year, usually during the Christmas holidays. It has a membership of about 3,000. Its official organ is The American Economic Review, published quarterly, and founded in 1911.

ECONOMIC CRISES. See CRISES, ECONOMIC.

ECONOMICS (Gr. *oikos*, 'house'; *nomos*, 'law'), originally the 'art of household management,' is now the science or study which deals with that part of man's social activities which is directed to the satisfaction of his wants. It is concerned with the production, distribution, and exchange of wealth—*i.e.*, of the material and exchangeable things which supply these wants. It is unfortunate that the term 'economy' has come to be thought of in relation to saving; as a matter of fact, economy is rather the art of a wise expenditure, an art best achieved by the person or state with some knowledge of the science of political economy. Hence economics is sometimes called an art and sometimes a science. Both terms are accurate. In the collection and investigation of the facts of wealth production, distribution, and exchange, and in our arrival at various laws which the facts demonstrate, we treat economics as a science. In the use we make of this scientific knowledge, personally or nationally, we prove that economy is an art.

The real importance of economics is generally recognized today. Unless there is some knowledge of how society is organized, and of what expenditure is profitable and what useless or mischievous, and some grasp of the principles of finance, states are in danger of becoming unstable. The economics of housekeeping implies knowledge of market prices in the matter of food, clothes, and rent, and the ability to put that knowledge into operation. Political economy implies similar knowledge for the whole community. The statesman-economist will be aware of the general standard of life, and will understand whether the industrial conditions are raising, depressing, or keeping stationary that standard. As the domestic budget on examination reveals either good or false budget economy, so the annual budget of the chancellor of the exchequer makes it plain whether the revenue of the state is being wisely raised and profitably expended, or whether, in defiance of all economy, the methods of supply are oppressive and the expenditure wasteful and extravagant. The material prosperity of a state depends so largely on the knowledge of economics in its legislators and administrators, and on the resolution to act upon knowledge, that whole communities languish in misery, devastated by disease and pre-mature death, where this knowledge and resolution are lacking. The social questions of the day, relations of labour and capital, housing, land tenure, tariff reform, etc., are only to be solved satisfactorily by the growth of economic knowledge. Of course scientific knowledge alone may not cure all social ills; there must be persons of good will to carry out the conclusions of economic science.

Practically the science of economics is modern, not dating back earlier than the 17th cent., though the teaching of the canonists in the Middle Ages covered the social relations of man and his fellows. The discovery of America and the wide development of foreign trade made political economy inevitable. Questions of foreign exchange and currency were discussed. Thomas Mun *d.* 1641 and Sir Josiah Child *d.* 1699 were the best-known writers of the 17th cent. But they and other contemporary inquirers were occupied with particular problems. It remained for Adam Smith 1723-90 to systematize the whole subject and virtually to create the science of economics as we now know it. Adam Smith's thought was dominated by the individualist point of view, but his *Wealth of Nations* 1776 is full of concrete details regarding agriculture and industry. The abstract method of dealing with economic factors is due to David Ricardo 1772-1823, and did much to promote the impression that economics was a 'dismal science.' In the latter part of the 19th cent., however, it was delivered from this reproach by his adoption of a more concrete and human outlook. Many economic theories of Adam Smith and his followers have been discarded as knowledge has increased, and the data for establishing theories have changed, notably the conception of the 'economic man,' whose sole motive in life was the pursuit of riches, who bought cheap and sold dear, and who, if he was a workman, readily transplanted himself to the other end of the earth for a rise in wages.

John Stuart Mill's *Principles of Political Economy*, first pub. in 1848, summarizes the progress of the subject up to that date. Many questions then regarded as settled have since been reopened by American and European Economists. But the subject has now become so extensive that special monographs have to be consulted on separate subjects. Economic history has now become very largely a separate subject of study.

ECSTASY, a vividly emotional state, or, in its religious usage, the absorption of the mental faculties in religious contemplation to such an extent that the normal sense action is suspended. The fact of conscious mental activity differentiates e. from catalepsy, but it is not clear that the phenomena are incapable of a purely psychological explanation.

ECUADOR, republic, N. W. of S. American (1° 30′ N. 4° 55′ S., 73° 30′-81° W.), on both sides of equator (hence name); bounded N. by Colombia, E. by Brazil, S. by Peru, W. by Pacific Ocean (coastline of *c.* 600 m.); area, *c.* 116,000 sq. m. There is still a boundary dispute with Peru; that with Colombia was settled in 1917. The surface consists of a low-lying coastal region stretching inland to the foot-hills of the Cordillera; hill country along Andes themselves, with plateaus 9,000 ft. above sea-level; and vast plain covered with forests—Provincia del Oriente—on slope from Andes eastward by headwaters of Amazon; great part of this district is now claimed by Peru.

Many of the peaks of the Andes in Ecuador are active volcanoes; principal summits. Chimborazo (20,500 ft.), Cotopaxi (19,610 ft.). Ecuador is drained to E. of Andes by Napo, Curaray, and other streams of the Amazon system; on W. are Daule, Vinces, Guayaquil, and other rivers flowing to Pacific. Lakes include Anatico, Supay, Aucacocha, in Provincia del Oriente, while in mountain districts are many tarns. Chief towns are Quito (cap.), Guayaquil, Cuenca, and Riobamba. The Galapagos Islands, 730 m. off W. coast, belong to Ecuador. Climate is tropical in lowlands, mean temp. being over 82° F.; in highlands there is an equable perpetual spring. In the E. there is heavy rain throughout the year; in W. and mountain plateaus there is hot rainy season from Dec. till May. Ecuador is subject to earthquakes, and eruptions are frequent.

Resources.—For a S. Amer. country Ecuador is poor in minerals; gold is found, and was produced at Zaruma in 1909; silver, platinum, petroleum, copper, and other minerals exist, but, owing to difficulties of transport, have not been greatly developed. Vegetation is everywhere luxuriant; cocoa is at present the staple produce, and sugar, coffee, and rubber are also cultivated—the latter is rapidly declining owing to destructive methods of collection; cereals, tropical fruits, tobacco, and cotton are produced, and in vast forests are valuable medicinal and other plants—sarsaparilla, balsams, cinchona, vegetable ivory, caoutchouc, etc. The industries are unimportant: straw hats and woolens; flour mills, breweries, sugar works; chief exports are coca, ivory nuts, rubber, silver, straw hats, sugar, coffee, gold; chief imports, textiles, machinery, food stuffs, oil, iron goods, wood. Railway mileage is about 400; but several new lines are under construction.

History.—For many centuries before the discovery of America, chief power in Ecuador was held by the Shiris of Quito, last of whom was defeated by Huaina Capac, Inca of Peru, towards end of 15th cent.; Ecuador was thus annexed to Inca kingdom, with which it was conquered by Spain *c.* 1532; became presidency of Span. Peru in 1548, and so remained (except for twelve years in early 18th cent.), until, like other Span. colonies, it attained independence in 1822; formed part of republic of Colombia until 1830, when it became a separate republic; since then it has suffered constant insurrections and revolutions.

The government is republican; executive vested in president (chosen by popular vote for four years), who is assisted by cabinet of five members and a council of state; legislative power given to congress of two houses—a senate of 32 members and a lower house of 48 deputies; these are both elected by popular vote. Ecuador is divided into sixteen provinces and one territory for purposes of local administration. Education is free and compulsory. There is a small army numbering some 6,000. Military service is compulsory by law of 1902. Most of the pop. is Indian, those of mixed blood forming one-third, and whites about one-twelfth. Pop. *c.* 2,000,000.

ECUMENICAL, see Œcumenical.

ECZEMA, catarrhal inflammation of the skin; in the first stage the skin is swollen and reddened with little pimples and has vesicles, which burst easily, letting a fluid out; in the second stage the external layer of the skin is peeled off, leaving a swollen, red, encrusted surface; and if the disease goes on to a third stage and becomes chronic without treatment, the discharge disappears, and a scaly patch is left. Any part of the body may be the site of the disease, and there is a burning or intensely itching feeling.

EDAM (52° 31′ N., 5° 3′ E.), town, Netherlands, province of N. Holland, with port on Zuider Zee; cheese. Pop. 7,000.

EDDA, two Icelandic works dealing with Scandinavian myth. The 'Elder' E. consists of thirty-three mythological and legendary poems written during IX., X., and XI. cent's, the existence of which was discovered by Brynjulf Sveinsson in 1643. The 'Younger' or prose E., written by Snorri Sturluson, about 1230, only came to light in 1628. It contains the fullest information extant upon Norse myth.; also treatises on poetry and prosody.

EDDIUS (VII. cent.), Anglo-Saxon author; wrote *Life of St. Wilfred.*

EDDY, CLARENCE (1851), an American organist, *b.* at Greenfield, Mass., son of George Sanger and Silence Cheney Eddy. He began his musical education at the age of 11 and later studied under Dudley Buck at Hartford, Conn., also the piano under Loeschorn and organ under August Haupt, Berlin. He was organist and choirmaster of the First Presbyterian Church, Chicago for 17 years and in 1875 became director of Hershey School of Musical Art. He played at the Vienna Exposition, the Panama P. I. and other expositions and gave recitals in principal American and European cities and was the author of several concert pieces and organ arrangements.

EDDY, MARY BAKER (1821-1910), religious leader and author; *b.* Bow, near Concord, N. H.; *d.* Chestnut Hill, Mass. She founded the Christian Science denomination, setting forth its tenets in *Science and Health,* the work on which her fame rests. Her family belonged to the Congregational Church and her early education in part was derived from private tuition by a pastor of that denomination. Later she discarded its doctrines. She was married three times, to Major George W. Glover in 1843, to Dr. Daniel S. Patterson in 1853, and to Asa Gilbert Eddy in 1877. Between 1844 and 1853 her writings in periodicals began to attract attention. During this period she also served as a teacher at Tilton (N. H.) Academy and opened a kindergarten school.

Her *Science and Health with Key to the Scriptures,* serving as the textbook of Christian Science, was written as a result of a long period of illness. In 1862, when a confirmed invalid through nervous disorders, she consulted a mental healer, Dr. P. P. Quimby, and was so benefited that she studied the process and later practised it herself. She had long been trying to trace all physical effects to a mental cause, and in 1866 concluded that all causation was mind and every effect a mental phenomenon. She could not find a publisher for *Science and Health,* and finally printed (1,000 copies) at her own cost in 1875. Its publication was followed by the formation of the First Church of Christ in Boston, in 1879. In 1881 she established the Massachusetts Metaphysical College in Boston for the training of Christian Science practitioners in mental healing. She remained the active leader of the creed almost to her death, despite an attempt in 1907 by legal steps to show that she was then mentally incompetent.

Her chief publications, in addition to Science and Health, were *People's Idea of God*, 1886; *Christian Healing*; *Retrospection* and *Introspection*; *Unity of Good*; *Rudimental Divine Science*; *No and Yes*; *Church Manuel*; *Christian Science versus Pantheism*; *Pulpit and Press*; *Poems*; *The First Church of Christ, Scientist*; and *Miscellany*, 1913.

EDDY, SPENCER (1874), American diplomat. *B.* in Chicago, January 18, 1874. Graduated from Harvard in 1896 with degree A. B., and studied at Berlin and Heidelberg. Private secretary to John Hay when Ambassador to Great Britain, 1897-1898; Clerk in the Department of State 1898-1899; 3rd Secretary American Embassy, London, 1899; 2nd Secretary at Paris, 1899-1901; 1st Secretary at Constantinople 1901-1903. (Charge d'affairs 1 yr.), St. Petersburg 1903-1906. (C. D. 1 year); Berlin 1906-1907. Minister to Argentina 1908-1909, and to Rumania, Serbia, and Bulgaria, January and September 1909, when he resigned. Lt. Commander U.S.N.R., March 1917.

EDELWEISS OR LEONTOPODIUM ALPINUM, a well-known species of Compositae which occurs in its wild state in Switzerland, but can be cultivated in Britain. The dense involucre consists of outer female florets and inner male florets, and these are surrounded by hairy bracts.

EDEN, GARDEN OF (Gen. 2:8), probably from the Babylonian word for 'plain'—*i.e.*, alluvial plain of Tigris and Euphrates; has been identified with various regions—*e.g.*, Armenia, Palestine, Mongolia—by different writers. Hommel thinks it was the plain about the sacred city of Eridu, in Babylonia, and the rivers he identified with wadis in N. and Central Arabia.

EDENTATES (order Edentata), an order of primitive Eutherian mammals found in America, Asia, and Africa. Their name, signifying 'toothless animals,' is misleading; for while functional teeth are absent in some, in others a series of similar teeth, lacking enamel, develops. In all forms, however, front or incisor teeth are absent, in most there are no functional milk teeth, and anteaters have no teeth at all. The feet are furnished with long, strong, nonretractile, and curved claws, adapted for climbing or burrowing, but causing the animals to walk with awkward gait. They are vegetarian, or in the majority of cases insectivorous. Fossil forms have been found in Upper Cretacious formations in S. America.

The order Edentata falls into two distinct sub-orders, with few structural features to connect them.

The New World forms are grouped in sub-order I., Xenarthra, the members of which have accessory articulations on the lumbar and posterior dorsal vertebrae. They include the sloths (Bradypodidae or Tardigrada), arboreal mammals which move back downwards amongst the branches in S. and Central Amer. forests, clinging always with their curved claws. They are shy, nocturnal, dull creatures, and live on leaves, young shoots of trees, and fruits. ANTEATERS (Myrmecophagidae) are confined to Central and S. America, but ARMADILLOS (Dasypodidae) range northwards to Texas. Remains of many extinct forms have been found in the Tertiary formations of America: the gigantic ground-sloths (Megatherium), etc., rivalling the elephant in bulk of body, and somewhat resembling sloths and ant-eaters; the scarcely less large Mylodon, with dermal bony plates; the herbivorous Glossotherium, probably domesticated by prehistoric Patagonians; and the armadillo-like Glyptodon and its relatives, with body protected by a coat of bony plates.

The Old World Edentates form suborder II., Nomarthra or Effodientia, without accessory articulating processes on the lumbar and dorsal vertebrae; only two distinct families—pangolins (Manidae), found in Africa, India, and S. E. Asia, burrowing creatures with strong, horny scales, which completely shield them when they roll into a ball, no teeth, but a long protrusible tongue for catching termites on which they mainly feed; aard-varks (Orycteropodidae), which are confined to Africa.

EDESON, ROBERT (1868), an American actor, *b.* at New Orleans, *s.* of George R. and Marion Talliferro Edeson. He was educated in the public schools of Brooklyn. He made his first appearance in 'Fascination' at the Park Theatre, New York in 1887 and later played in many successes. He was leading man in 'The Climbers' and starred in 'Soldiers of Fortune' 1902-4; 'Ransom's Folly'; 'Strongheart' 1905-7; 'Classmates', 1907; 'The Call of the North', 1908; 'The Noble Spaniard', 1909 and 'Fine Feathers' in 1913.

EDESSA, ancient capital of Macedonia; modern Vodena.

EDESSA, ancient city N. Mesopotamia (37° 11′ N., 39° E.), between Aleppo and Diarbekir; called Ur in the

Bible. From 137 B.C. to A.D. 216 Edessa became cap. of an independent kingdom. A Christian principality founded here by Crusaders (*c.* 1100) was destroyed by Saracens (*c.* 1150); has interesting archaeological remains. Modern town, called Urfa, is a flourishing centre for cotton industry, and has large grain trade; inhabitants are mostly Christian Armenians. Pop. 55,000.

EDFU (24° 59′ N., 32° 41′ E., (town, on Nile, Upper Egypt; ancient *Apollinopolis Magna*; has most perfect existing example of Egyptian temple (*c.* 200 B.C.). Pop. 15,000.

EDGAR, THE PEACEFUL (944-975), Eng. king; *s.* of Edmund I.; succ. his bro. Eadwig in 959; became emperor of Britain.

EDGAR ATHELING (*c.* 1058-1125), Eng. prince; *gs.* of Edmubd Ironside; after death of Edward the Confessor was next heir to Eng. throne, but his claim was never strongly advanced, and he subsequently lived on peaceful terms with the Norman kings.

EDGE, WALTER EVANS (1873), a U. S. senator, *b.* at Philadelphia, *s.* of William and Mary Evans Edge. He was educated in public schools. He began as a printers 'devil' and later was prop. of the Atlantic City Daily Press and the Atlantic City Evening Union. In 1879 he became journal clerk of the New Jersey Senate and after being secretary of the senate, member of the New Jersey Assembly, and serving in various other political positions he was elected governor of New Jersey for the term of 1917-20 but resigned in 1919 to take a seat in the United States Senate for the term of 1919-25.

EDGEHILL (52° 7′ N., 1° 30′ W.), ridge, Warwickshire, England; scene of first battle in Civil War, Oct. 23, 1642.

EDGEWORTH DE FIRMONT, HENRY ESSEX (1745-1807), Fr. ecclesiastic; confessor to Louis XVI. at his execution; author of *Memoirs.*

EDGEWORTH, MARIA (1767-1849), Irish novelist; *d.* of Richard Lovell E. (*q.v.*); her first novel, *Castle Rackrent* 1800, was followed by *The Absentee, Ormond*, and other stories. She excelled as a delineator of Irish character, and her works were otherwise distinguished by humour and originality. Her success inspired Scott to undertake the 'Waverly' novels.

EDGREN-LEFFLER, ANNE CHARLOTTE, DUCHESS OF CAJANELLO (1849-92), Swed. authoress; she wrote plays, stories, and realistic sketches of Swedish life.

EDHEM PASHA (1815-90), Turk. grand vizier.

EDINBURGH, cap. of Scotland, near Firth of Forth, now includes Leith and the suburbs of Portobello and Granton (55° 57′ N., 3° 12′ W.). Edinburgh is famed for its natural beauty, stirring history, literary and romantic associations, and educational institutions. Its situation—built on and amid hills (Castle Rock, Calton, Arthur's Seat, Blackford Hill, Braids, Corstorphine, etc.)—near the sea, its architecture, and its renown as a centre of learning have earned for the city the title of the 'Modern Athens.' The castle—containing St. Margaret's Chapel (11th cent.), Queen Mary's room, Scottish regalia, etc.—overlooks both Old and New Town from the Castle Rock, which, like Arthur's Seat, marks an old lava vent. The castle is to be National War Memorial. Historic High Street runs down to ruined Holyrood Abbey (begun *c.* 1128 on site of earlier church) and Palace (dating from 15th cent.; Queen Mary's and Darnley's apartments). Other notable features of Old Town are lofty houses and quaint 'closes,' streets, and squares, St. Giles' Church (15th cent.), Parliament House (law courts), Tron Kirk 1637, municipal buildings, John Knox's house, Tolbooth, Moubray, Moray, and Huntly houses, and Greyfriars' Church.

Princes Street, in New Town, ranks amongst finest streets in world; Scott Monument, Royal Institution, National Picture Galleries, Register House and many handsome buildings.

A professional rather than a manufacturing town, in printing, publishing, bookbinding, insurance, banking, and retail shopkeeping, Edinburgh claims to be second to London; other industries include brewing distilling, milling, baking, rubber works, engineering, chemicals, scientific instruments, paper making, fisheries. Education is called Edinburgh's 'chief industry'; one of the greatest educational centres in world; univ. (founded 1582; great medical school), many fine secondary schools, including Royal High School (16th cent.), George Heriot's School 1659, four Merchant Company schools, Academy, Fettes College, Merchiston; Donaldson's Hospital and other colleges and institutions.

One explanation, by no means universally accepted, attributes the name of the city to its foundation by Edwin of Northumbria (*Edwin's Burgh*) *c.* 620; town made a royal burgh by David I. (early 12th cent.); took prominent part in Anglo-Scottish and civil wars; Leith port assigned to Edinburgh by Robert

Bruce 1329; charter granted by James III. 1482; thenceforward recognized cap. of kingdom and centre of its history; James VI. removed court to England 1603) Union abolished Scot. Parliament and threatened city with ruin 1707; Prince Charlie entered Edinburgh 1745; New Town begun in later 18th cent.; great literary outburst under Scott *c.* 1800, followed by revivals under Carlyle and Stevenson. Pop. with Leith, 400,700.

Leith is continuous with the city, and lies on the S. shore of the Firth of Forth; harbour works extensive, and quayage exceeds 4 m. Industries: engineering, shipbuilding, flour milling, sugar refining, chemical manufactures, and saw milling. Chief imports: grain, flour, sugar, chemicals, esparto and timber. Exports: coal, iron, petroleum, whisky, and paper. Has a long and varied history; twice seized and burned by Earl of Hertford 1544, 1547; held by Cromwellian troops 1650; Jacobites burned custom house 1715.

EDISON, THOMAS ALVA (1847), American inventor; *b.* Milan, Ohio. His early schooling amounted to little, for at the age of 12 he became a trainboy of the Grand Trunk Railway. His alert mind and insatiabledesire for knowledge rapidly made amends for his lack of education, and at the age of 15 he was printing, editing and published a small paper of his own that had its clientele of about 300 among the employes of the road. He learned telegraphy, and in 1864 invented an automatic telegraph repeater. Then he went to Boston, where the invention of a commercial stock indicator netted him $40,000. With this he established a manufacturing plant at Newark, N. J., which he gave up shortly afterward in order to devote himself wholly to invention. His achievements were so extraordinary that his wealth grew with his fame and enabled him to build great plants at Menlo Park and West Orange, N. J. that have been the birthplaces of some of the greatest inventions the world has known. He took out patents on more than 300 inventions, besides having originated hundreds of minor devices and improvements that he did not patent. Among the most notable of his achievements are the phonograph, the incandescent electric lamp, the long distance transmission telephone, the megaphone, the kinetoscope, the carbon telephone transmitter, the duplex telegraphic system, the nickel-iron storage cell and the aerophone. He was given medals and decorations by all the great nations of the world. He was an omnivorous reader and an indefatigable worker.

EDMONTON (51° 37′ N., 0° 3′ W.), town, Middlesex, England; burial-place of Charles Lamb. Pop. 1921, 67,800.

EDMONTON, a city of Canada, and cap. of the prov. of Alberta. It is situated on the N. Saskatchewan R. at an elevation of 200 ft. above it, and opposite the town of Strathcona. It has grown considerably since 1905, when it was chosen as the capital. There are many large handsome buildings, including colleges, schools, banks, and a hospital. It possesses an excellent water supply, electric lighting and telephone service. Coal is mined in the neighborhood. Pop. 1921, 58,627.

EDMUND (fl. 855-70), king of East Anglia; defeated and slain by Danes; canonised as saint for religious constancy.

EDMUND I. (*d.* 946), king of the English; *s.* of Edward the Elder, succ. his half-bro., Athelstan, in 941; successful warrior.

EDMUND (1245-96), Earl of Lancaster and king of Sicily; Crusader.

EDMUND 'IRONSIDE' (989-1016), Eng. king; *s.* of Ethelred II.; renowned for valour.

EDMUND, ST. (*d.* 1240), Edmund Rich, a distinguished scholar of Paris and Oxford, became treasurer of Salisbury, then abp. of Canterbury on death of Stephen Langton.

EDMUNDS, CHARLES KEYSER (1876), an American college president, *b.* at Baltimore, *s.* of James Richard and Anna Smith Keyser Edmunds. He graduated from Johns Hopkins University in 1897. He was magnetic observer, U. S. Coast and Geod. Survey 1899-1900 and later instructor in physics in several American universities. In 1903 he went to China where he became connected with the Canton Christian College as professor of physics and elec. engring. and in 1908 was made president of that institution. He was also magnetic observer in China, for the Carnegie Institution of Washington from 1906-07.

EDMUNDS, GEORGE FRANKLIN (1828-1919) American politician. *B.* at Richmond, Vt., Feb. 1, 1828. *D.* Feb. 27, 1919. Educated at Common Schools, be began the practice of law in 1849. After moving to Burlington, Vt. he was a member of the Legislature 1854-1859; speaker 1856-1859, president of the senate 1861-1862. On the death of Solomon Foote in 1866 he filled out the former's unexpired Term in the U. S. senate and was three times re-elected for full terms, resigning in 1890. Was a member of the Electoral Commission 1877 and author of the 'Edmunds Act' of 1882 suppressing polygamy in Utah; and of the Anti-Trust law if 1890. He was president pro tempore of Senate during President Arthur's term, and in 1897 chairman of the monetary commission of the Indianapolis monetary conference. Retiring from public life, he became noted as a constitutional lawyer.

EDOM was the country S. of Palestine, where people were closely akin to the Jews. According to *Genesis* the Edomites were descendants of Esau; genealogy in *Genesis* 36 reflects the tradition of mixed descent from Canaanites, Ishmaelites, and Horites. In 711 B.C. E. joined the league with Philistia, Judah, and Moab against Assyria; and then, like the rest, submitted.

EDRED (*d.* 955). Eng. king; friend of St. Dunstan.

EDRIC (fl. 1007-17), Mercian ealdorman; notorious for treachery.

EDSON, CYRUS (1857-1903) American physician. *B.* at Albany, New York in 1857. He graduated from Columbia University and the N. Y. College of Physicians and Surgeons. Appointed assistant sanitary inspector of New York City he became Health Commissioner in 1893, and then H. C. of New York State. He was three times president of the Board of Pharmacists of the city and county of New York. Was noted as a bacteriologist and as an inventor of surgical instruments and wrote extensively on medical and sanitary subjects.

EDSON, JOHN JOY (1846), an American banker, *b.* at Jefferson, Ohio. He received his early education in public schools and after serving in the Civil War from 1861-3 he studied law at George Washington (then Columbian) University and was admitted to the bar in 1869. He was clerk in the Treasury Dept. 1863-75, was later patent atty., and in 1879 organized the Equitable Co-op. Building Association of which he was president from 1898. In addition to being director and chairman of the board of several financial institutions he was president of the American Red Cross from 1894-1917 and was identified with many political, charitable and reform commissions, boards and associations including treasurer and director of the Chamber of Commerce, U. S. A.

EDUCATION, AGRICULTURAL. See Agricultural Education.

EDUCATION, AMERICAN. The American educational system shares a common parentage with that of other countries in having been inherited from the spread of knowledge estimated by Protestantism, and, further back, by the Italian Renaissance and Grecian culture. Modern Democracy, broadening the scope of that inheritance, affirmed that it was the duty of society not only to educate all the people, but to break down the barriers that reserved higher culture for the well-placed and restricted the education of the poorer elements of the population to elementary knowledge. The United States has been the most forward-looking of all countries in democratizing education by discarding standards that measured the quality and extent of education according to a pupil's social grade and family resources. The wealth of many successful Americans has been poured into college endowments to enable the people at large to have the best that scholarship can offer. Public and collegiate schools opened the way to all culture for every student disposed to pursue learning.

The beginning of American public education reflected the influence of European institutions. The apprenticeship system reigned in early colonial days, and the conception of education by the public authorities was largely confined to a half-hearted effort to teach poor boys and orphans a trade. The system, supported by taxation was disliked by aristocratic Virginia, and did not prosper in that colony; even an attempt to found a college in 1622 failed. Massachusetts, more progressive, not only required neglected children to learn an occupation, but decreed that they should know how to read and write and be instructed in religion and in the country's laws. Townships were called upon to establish grammar schools to qualify boys for Harvard, which had been founded in 1636, and voluntary contributions paid the fees of poor pupils, to be later replaced by the provision of education funds from taxation and public moneys. In Massachusetts, as elsewhere, the Church was a foremost influence in public education. In New Amsterdam (New York) a school—the first of record there—was opened by the West India Company, but under church control. Maryland established free schools, supported by public taxes, in 1695, and South Carolina in 1712. New England followed the Massachusetts system. The Southern colonies retained the class instincts of the mother country and only recognized education for the well-to-do through tutors and private schools, while the church and civil authorities combined to direct public instruction in New Amsterdam and Pennsylvania.

The elementary schools that sprang up

were taught by women. Only reading and writing were imparted as a rule; sometimes arithmetic was included, and later sewing in New England, girls being admitted. These dame schools were the lower rung for the grammar schools, where instruction in the classics and religion predominated.

The eighteenth century brought new immigration, a religious revival, an expansion of commerce, the birth of the American press and scientific development. All were influences that gave an impetus to education and produced the establishment of academies, with a more advanced curriculum than the grammar schools. Franklin stressed the need of such institutions to bring education into line with progress in other directions. Among the establishments formed were the Phillips Academies at Exeter and Andover, Groton, Erasmus Hall, Nazareth Hall at Bethlehem, and the Philadelphia Public Academy, the last, opened in 1749, being the forerunner of them all. A feature they developed from the dame schools was co-education, many of them admitting both sexes, while others were solely for girls. But it was the nineteenth century that really started female education on the lines known today.

After the Revolution the States set themselves the task of fostering education, they were mainly interested in the higher branches. Washington, as did Jefferson and Madison, wanted a national university, but none was established, and there is no such institution today. Elementary instruction remained confined to private or local effort. The establishment of public systems of education that fitted the times began in 1837-8 in Massachusetts and Connecticut where state board of elections were organized through the efforts of two pioneers of modern education, Horace Mann and Henry Barnard. Cities began to appoint superintendents of schools, beginning with Buffalo and Louisville. The conception of educational functions and service widened, bringing about compulsory attendance, additional subjects, such as manual training, kindergarten, the founding of training schools for teachers, and, notably, the establishment of the U. S. Bureau of Education in 1867 with Barnard as its first commissioner. This body is a clearing house for information. It has no authority over educational institutions, which are the State's affair, but the country's educational system is nevertheless national in character, due largely to bodies like the National Education Association, teachers' colleges, educational periodicals, standardized college entrance requirements and the influence and benefactions of the General Education Board (which dispenses large sums for education donated by John D. Rockefeller), and the Sage and Carnegie Foundations (*qq. v.*) All that the federal government does directly for education relates to supplying funds for land grant colleges and agricultural experiment stations and to developing vocational education.

The State boards of education formulate educational requirements, such as compulsory attendance and teachers' qualifications. They also apportion funds levied for education equipment, exercise supervision of schools, including buildings and equipment, supervise the training of teachers, and provide in some cases for the higher education of adults through extension courses. Local authorities are charged by the State with the responsibility for providing schools. Towns, townships, counties and cities are thus the agencies through which the State pursues its educational policy. The modern tendency in rural districts is for the counties through a board to assume the burden of establishing and maintaining schools, employing and paying teachers and deciding the school tax rate. In the cities, where education has naturally made the greatest strides, public instruction is in the hands of similar boards, whose functions are wide and complex, with the superintendent of schools becoming an increasingly important official. In some cities he is aided by a business manager, school architect, medical inspector, instructors in special subjects, and by directors of playgrounds, physical development and evening classes.

The universality of American education of today as an integral part of the upbringing of youth embraces a field that far surpasses the earlier system of common and high schools. It seeks to meet the educational needs of everybody without restriction as to age or subjects, and includes physical and mental defectives and the delinquent. The adult with a neglected education is as much its concern as the uninstructed young.

Nearly all the states require school attendance from the ages of six to thirteen or fourteen—in New York sixteen; but compulsory attendance is not everywhere enforced, or in some localities, enforceable. Kindergarten paves the way for a tuition which should be ample, if followed, for the education of most citizens, including, as it does, reading, writing, arithmetic, geography, American history, music, drawing, physiology, hygiene, civics, domestic science and manual training. For secondary education, there are high schools that offer courses in established subjects with little liberty of selection by the student, and others that teach a variety of eclectic subjects, such as English and modern languages, classics, science, and commercial education. For higher education there are all the famous colleges, beginning with Harvard, William and Mary and Yale; the State universities, and women colleges.

Vocational education, a recent development, became sponsored by the national government through a federal board whom Congress authorized to co-operate with the State in establishing and maintaining industrial classes throughout the country. These classes are held at evening, part-time, all-day, or part-time continuation schools. The schools in 1920 numbered 3,859 and aided in the vocational training of 305,224 pupils of both sexes with the employment of 9,906 teachers. The courses include agriculture, trades, home economics and teaching.

The growth of business colleges and of business training in the secondary and higher seats of learning is another indication of educational progress. The Wharton School of the University of Pennsylvania was an early pioneer in introducing commercial education into the college curriculum, and the establishment of such courses or departments in high schools and colleges soon became general. Leading universities include commerce in the tuition of their colleges of liberal arts and a number confer the degree of commerce.

The general spread of knowledge in the United States can best be visualized by the statement that in 1922 there were 277,609 educational establishments, composed of 271,319 public-school buildings, 618 colleges, universities and professional schools, 92 junior colleges, 449 normal schools, 2,093 private secondary schools, 10,283 private commercial schools, and 1,755 nurse training schools.

There were 14,000 high schools, but out of 1,000 students only 418 graduate. Most of them stay into the second year, and only half survive the third year. More girls than boys enter high school. Out of 665,000 secondary students enrolling for the first year, only 45% were boys and the proportion declined still further by the fourth year to 38%. In private high schools the boys retain their ratio (about the same as in the public schools) from enrollment to the fourth year.

The average daily attendance in United States public schools was determined by the census of 1919 at 2,940,540, with a total current expense of $222,157,892, or an average annual cost per pupil of $75.55. The census also showed that of 15,306,793 children between the ages of seven and thirteen, 13,869,010 attended school; 3,907,710 between fourteen and fifteen, 3,134,129 attended; of 3,828,131 between sixteen and seventeen, 1,644,061 attended; and of 5,522,082 between eighteen and twenty, 214,651 attended school.

As to illiteracy in the forty eight states, and the District of Columbia, containing 82,739,815 persons of ten years of age and over, only 4,931,905 were illiterate, including 1,242,572 native whites, 1,763,740 foreign-born whites, and 1,842,161 negroes.

The twentieth century brought marked changes in American economic and social life which reacted in diminishing the influence of the home upon many children and enlarging the functions of the public school. The American teacher has become social guide to her charges as well as an instructor of knowledge. Millions of parents, largely dwelling in city tenements, which are mere conveniences for eating and sleeping, are unable to exercise the old-time home supervision over their children, vast numbers of whom find their interests on the street when not in school. Lack of home training in conduct and manners has accordingly thrown an additional burden on public schools. Teachers are confronting every day the necessity of remedying the adsence of home guidance in preparing children for life. Moral training being recognized as the true and first aim of education, it is becoming more and more the duty of the public schools to teach their pupils the fundamentals of good citizenship as a part of their curriculum.

Social influences are strongly manifested in colleges and universities. There is a decided disposition among many students to regard the social attractions of a collegiate environment as of more importance than the opportunity it presents for acquiring scholarship. Study is often an obligation undertaken only as a condition precedent to their being able to participate in recreational activities, such as football, rowing, fraternities and other diversions. The senior class, rather than the faculty, dominate the student morale and determine standards that inspire emulation. It has been observed that high scholarship does not of itself command great prestige, but must be conjoined with social prominence or personal popularity, with the important addition of active participation in the more conspicuous athletic and other undergraduate pursuits. Relatively few students become distinguished both in scholarship and sports. The conclusion drawn is that while students do not generally count scholastic distinction as the chief end of a college career, their interacting influence on one another in their social activities is an important factor in character development, which may be deemed to be some compensation for their lack of interest in learning for itself. See CO-EDUCATION; ELECTIVE COURSES; HIGH-SCHOOLS UNIVERSITIES AND COLLEGES, AMERICAN.

EDUCATION, COMMERCIAL, special instruction for the purpose of preparing students for a business career. This type of education twenty years ago was left almost entirely to the private business schools, or colleges, but within recent years it has been taken up by the public high schools. Business courses are now available in most high schools throughout the country, and about a third of all the enrolled students are taking them. Special commercial high schools have been established in many of the larger cities, notably in Boston, Mass., Cleveland and Columbus, O., New York City, Portland, Ore., San Francisco, Cal., and Syracuse, N. Y. Where such courses are given about a quarter of the time of the students is devoted to technical training in commercial practice, another quarter is given to related work and half the time is taken up with general culture. The technical training usually consists in instruction in office practice, bookkeeping, stenography, typewriting, the operation of office appliances and salesmanship. The courses in the private commercial colleges and schools differ from those given in the public high schools in being more direct, no time being given to any study not related to the object in view. For this reason an average business college affords in six months the instruction covering four years in a high school. In 1922 there were 1,283 such schools or colleges in the United States.

EDWARD I. (1239-1307), king of England; *s.* of Henry II. and Eleanor of Provence; succ. his f., 1272, being himself then a Crusader; had already fought in Civil War against Simon de Montfort. E.'s reign is one of the most important in Eng. history. Numerous measures were passed, the Statute of Westminster, Winchester, Mortmain etc., and the Jews repelled. Wales was conquered, and an unsuccessful attempt made to subdue Scotland. Important also were wars with France. Eng. parliamentary life developed in his reign, and he can fairly be called the creator of the House of Lords and the House of Commons.

EDWARD II., OF CARNARVON (1284-1327) king of England; succ. his f., Edward I., 1307; fell under power of his favourite, Piers Gaveston; total rout of *Bannockburn* destroyed Eng. supremacy in Scotland. He was deposed and murdered in Berkeley Castle.

EDWARD III., OF WINDSOR (1312-77), king of England; succ. on deposition of his f., Edward II., 1327. In 1337 broke out the Hundred Years War with France, in which were won the famous victories of *Crecy* 1346 and *Poitiers* 1356. England was ravaged by the Black Death in 1349. E. gave up claiming the throne of France, which he had made a pretext for war.

EDWARD IV. (1442-83), king of England; *s.* of Richard, Duke of York, whose claim to throne caused Wars of Roses; succ. on deposition of Henry VI., 1461, and reigned till his death, except during Henry's short resoration, 1470-71.

EDWARD V. (1470-83), king of England; *s.* of Edward IV.; murdered in Tower, by order of uncle, Richard III.

EDWARD VI. (1537-53), king of England and Ireland; *s.* of Henry VIII. and Jane Seymour; succ. his f. in 1547. His short reign is important for religious history.

EDWARD VII. (1841-1910). Albert Edward, eldest *s.* of Queen Victoria and Prince Albert; *b.* Buckingham Palace Nov. 9, 1841. As Prince of Wales he travelled extensively, visiting Canada and U. S. 1860, India 1875. In 1863 he married Alexandra, the King of Denmark's eldest daughter; their children being Albert Victor, Duke of Clarence, *b.* Jan. 8, 1864, *d.* 1892; George (GEORGE V.), *b.* June 3, 1865; Louise (Princess Royal), *b.* Feb. 20, 1867; Victoria, *b.* July 6, 1868; Maud (Queen of Norway), *b.* Nov 26, 1869. The Prince of Wales became king Jan. 22, 1901, and until his death devoted himself unsparingly to his kingly duties; Corouation Aug. 9, 1902. Notable events of his reign were end of S. African War 1902 and formation of Union of S. Africa 1909-10; House of Lords crisis 1909-10; Anglo-Japanese Alliance 1902; cementing of *Triple Entente* with France and Russia 1904-10. King Edward died, May 6, 1910. During his brief reign he earned the title of 'Edward the Peacemaker' by his tact and diplomacy.

EDWARD THE CONFESSOR (*d.* 1066), king of England; *s.* of Ethelred II.; succ. on the death of Canute II. 1042.

EDWARD THE ELDER (*d.* 924), king of the Angles and Saxons; *s.* of Alfred the Great, whom he succ. in 901; subdued the Welsh and became 'Emperor of Britain.'

EDWARD THE MARTYR (*d.* 978), Eng. king; murdered at Corfe Castle, Dorset.

EDWARDS, AMELIA BLANDFORD (1831-92), Eng. novelist and Egyptologist; founder of Egyptian Exploration Fund.

EDWARDS, CLARENCE RANSOM (1860), a maj.-gen., U. S. Army, *b.* at Cleveland, O., *s.* of William and Lucia Ransom Edwards. He graduated from the U. S. Military Academy in 1883, and afterwards served on various duties and stations, including service in the Philippines with General Lawton and later command of the United States troops in the Panama Canal Zone, 1915-1917. In August, 1917, he organized the 26th Div., U. S. A., and the following September sailed to France where he did ten months front line duty in the sectors of Chemin-des Dames, Toul, Champagne-Marne, Aisne-Marne, St. Mihiel and Meuse-Argonne, with the rank of major-general. He returned to the U. S. in 1918 and after various assignments was given command of 1st Corps Area headquarters, Army Base, Boston, 1921.

EDWARDS, DAVID MORTON (1871), an American college president *b.* at Earlham, Ia., *s.* of Ira Wilson and Naomi Lindley Edwards. He was educated at Penn college, Ia., University of Chicago and at Boston University. He began teaching at Dexter, Ia., in 1889, was president of Penn College, Oskaloosa, Ia., from 1910 to 1917 and in 1917 became president of Earlham College at Richmond, Ind. He was also chairman of the Board of Education of Five Year Meeting of Soc. of Friends in America.

EDWARDS, EDWARD IRVING (1863), governor, *b.* at Jersey City, N. J., *s.* of William W. and Emma J. Nation Edwards. He was educated at New York University. He became connected with the First National Bank, Jersey City, in 1882 and after various promotions was made president of that institution in 1916. He was state comptroller, N. J. from 1911-17, became a member of the State Senate from Hudson County in 1919 which position he resigned, and was elected governor of New Jersey for the term 1920-23.

EDWARDS, HOWARD (1854), an American college president, *b.* at Fauquier co., Va., *s.* of Francis Marion and Frances Lawson Bland Edwards. He was educated at Randolph-Macon College, Va., the University of Leipzig and at the Sorbonne, Paris. He was associate principal, Bethel Military Academy, 1878-80; teacher at Bingham School, N. C., 1880-2; principal of Bethel (Va.) Academy, 1882-4 and of the academy at Tuscumbia, Ala., 1884-5; professor of English and modern languages at the University of Arkansas, 1885-90, and same at Michigan Agricultural College, 1890-1906, and in 1906 became president of R. I. State College.

EDWARDS, JONATHAN (1703-58), Amer. theologian, was proficient in Gk., Latin and Hebrew at thirteen, when he entered Yale Coll.; grad. with high honours in 1720; became a preacher in 1722, tutor in Yale Coll. 1723; pastor of Congregational Church at Northamptoh 1727. He held that the Lord's Supper was for the converted only, and was dismissed his church; went as missionary to Indians; became Pres. of Princeton Coll. 1757; author of many books. He was a man of great learning and deep piety, a vigorous defender of the Calvinistic theol. Wrote 'The Freedom of the Will.'

EDWARDSVILLE, a city of Illinois, in Madison co., of which it is the county seat. It is on the Wabash, the Illinois Traction, the Toledo, St. Louis and Western, and other railroads. The surrounding country is an important agricultural and coal mining area. There are manufactures of tools, plumbing supplies, radiators, brass furnishings, etc. There is a public library. Pop. 1920, 5,336.

EDWARDSVILLE, a borough of Pennsylvania in Luzerne co. It is on the Delaware, Lackawanna and Western Railroad, and is a residential suburb of Wilkesbarre. Pop. 1920, 9,027.

EDWIN, EDWINE (585-633), king of Northumbria; succ., 617; baptized, 627; founded Edinburgh; slain in battle with Penda, king of Mercia.

EDWY THE FAIR (959), Eng. king; *s.* of Edmund and Ælfgifu; succ. Eadred 955; his favour towards Wessex offended Mercia and Northumbria, and Edgar Ætheling supplanted him as ruler over these kingdoms.

EECKHOUT, GERBRAND VAN DEN (1621-74), Dutch painter of religious subjects.

EECLOO (51° 12′ N., 3° 33′ E.), town, E. Flanders, Belgium; woollens, cottons. Pop. 12,000.

EELS (*Anguillidoe*, etc.), long snakelike bony fishes, without ventral or tail fins, and with small scales set in groups; found in all temperate and tropical seas down to 2500 fathoms, and many in fresh and brackish waters. E's appear to spawn only in the deep sea, and to reach suitable grounds adult females migrate from the rivers. The young return as transparent 'glass-eels,' and ascend streams and brooks in incredible numbers—'eel-fairs'—sometimes swarming through the grass on the banks. Species are the common e. (*Anguilla vulgaris*), the gigantic marine conger (*Conger vulgaris*), and the rare murry or moray (*Muroena helena*), a Muraenoid e. (*Muroenidoe*) common in the Mediterranean. The last, like many of the e's, is much esteemed as food.

EFFENDI, respectful form of address used towards males in Turkey.

EFFICIENCY, INDUSTRIAL, a modern development of business operation based upon an ascertained standard of work and output. and determining therefrom the measure of efficiency according as it is below or above the standard. The principle has been applied to production and the price thereof; manufactures and the profits involved; transportation and charges therefor; the ratio of work done by machinery to the energy supplied; and to tests of workers, mental and manual, of varying capacities and grades. College examinations are tests of intellectual efficiency as disclosed by the points allowed. Sport contests grade physical efficiency.

In industry the method is conducted by an efficiency engineer, who minimises waste due to lax methods in handling materials and equipment and in organizing and assigning the personnel. It is his function to lessen industrial losses and to obtain results with less materials, less labor and less equipment than under the old system. The task involves the examination and removal of friction, both by the clashing of methods of different departments and by the contact of discordant personalities whose services to an undertaking would be enhanced by being kept apart. Working hours, the problem of overstrain and fatigue, welfare work and a consideration of physiological, physical and psychological factors related therewith are important elements in an efficiency engineer's functions.

EFFIGIES, SEPULCHRAL, sculptured figures, or figures in relief, upon monumental tombs which date from the XII. cent. At first there was probably little attempt to produce a portrait of the person commemorated, but during the XV. cent., and later, very careful attention was given to portraiture and details of armour and costume. E's are now esteemed as invaluable in tracing the development and changes in the history of costume, arms, and armour. Worcester Cathedral, England, contains the e. of King John; Westminster has many royal e's.

EGAN, MAURICE FRANCIS (1852), an American diplomat and writer, *b.* in Philadelphia, Pa. He graduated from La Salle College, in 1873, took a post-graduate course at Georgetown College, in Washington, D. C., then took up journalism, being sub-editor of McGee's Illustrated Weekly during 1877-9, of the Catholic Review during 1879-80, associate-editor, then editor, of The Freeman's Journal, 1880-8, after which he was for seven years professor of English at the University of Notre Dame, and professor of the English language and literature at the Catholic University of America, from 1895 until 1907. In the latter year he was sent to Denmark as Envoy Extraordinary and Minister Plenipotentiary, where he remained until 1918. It was during his term of office that the Danish West Indies were bought by the United States. He was offered the ambassadorship to Vienna by both President Taft and President Wilson, but declined. Among his many works are 'The Life Around Us'; 'Modern Novelists', 'Songs and Sonnets, and other Poems'; In a Brazillian Forest'; 'The Ghost in Hamlet, and other Essays in Comparative Literature'; 'The Ivy Hedge' 1914, and 'Ten Years on the German Frontier' 1919.

EGAN, PIERCE (1772-1849) Eng. humorist and sporting writer; author of *Tom and Jerry's Life in London, Life of an Actor.*

EGBERT, JAMES CHIDESTER (1859), an American educator and author, *b.* at New York, *s.* of Rev. James C. and Louisa Drew Egbert. He was educated at Columbia University, where he was afterwards professor of Latin and director of the School of Business, and also of extension teaching. He was also professor in Latin at the American School of Classical Studies, Rome, during 1903-4. He was the author of Macmillan's Shorter Latin Course, 1892 and Cicero de Senectute, 1895, wrote several articles in Harper's Dictionary of Classical Antiquity and the New Internat. Encyclopedia and was general editor of Macmillan's Series of Latin Courses.

EGEDE, HANS (1686-1758) missionary in Greenland; principal of Missionary coll., Copenhagen.

EGER.—(1) (50° 5′ N., 12° 22′ E),. town, Bohemia, Austria, where Wallenstein was assassinated 1634; has ruined citadel; manufactures machinery, textiles, beer. Pop. 28,000. (2) (47° 55′ N., 20° 23′ E.), town, Hungary; archiepiscopal see; produces wine; also called Erlau. Pop. 28,000.

EGERIA (classical myth.), female deity, one of the Camenae, held in veneration by ancient Italians; said to have initiated Numa Pompilius in religious innovations.

EGG ALBUMEN. See ALBUMEN.

EGG, the female reproductive cell which develops into a new individual. In all but parthenogenetic animals, this process only takes place after fertilisation by the male gamete. When the word is used in this sense, it is directly parallel to the Latin word ovum, and applies to the intra-maternal as well as the extra-maternal existence of the cell. In common speech the word only applies to the extra-maternal ovum. Eggs vary very greatly in size. In all cases the essential embryo is very small, but variations occur in the amount of yolk present, and in the thickness and structure of the surrounding parts.

Birds lay on the whole the largest eggs. The eggs of the extinct Æpyorius have a cubic content of over two gallons. The ostrich lays the largest eggs of any extant bird. It weighs about as much as twelve hens' eggs. At the other end of the scale is the E. of the humming bird which only weighs a few grains. The shell of a bird's E. is mainly composed of carbonate of lime. It is often coloured, the colouring being specific to the particular variety of bird. Seven different pigments have been separated from the colouring of Es. Their origin is still obscure, but they are probably derived from the haemoglobin in the blood, and may be in some way similar to bile-pigments. The significance of the colour of Es. is difficult to understand. It probably depends upon the environment of the nest. Thus snakes and such birds as deposit their Es. in holes and in domed nests lay white Es. In such cases coloured Es. would be invisible, and they would be in danger of being broken by the mother. Es. which are laid in open nests, or on the bare ground, are coloured to imitate their surroundings. The brilliant Es. are always found in nests with elaborate protective devices, or in ones that are carefully hidden.

Eggs of mammals.—Only two mammals are oviparous: the *Echidna* or *spiny ant-eater*, and the *Ornithorhynchus*, or *duck-billed platypus*. The *Echidna* carries her Es. in a pouch such as the kangaroo has.

Eggs of reptiles.—These are always white or yellowish. They are smaller than birds' Es., but yet possess a good deal of yolk. The shell is nearly always membranous, but in tortoises, turtles, and crocodiles it is calcareous like a bird's. A few lizards and snakes are viviparous.

Eggs of fishes differ greatly in size and appearance, and some extraordinary varieties are known. Most fishes lay enormous numbers of Es. The sturgeon lays 7,000,000 Es., the turbot over 14,000,000. The number always depends on the risk of destruction, and this rule applies to all animals. For further particulars, see BIRD, POULTRY, REPRODUCTION.

EGG PLANT, a herbaceous plant which grows from 1 foot to 18 inches high. It has a large white or purple flower. The fruit is a sphere and is generally white, yellow or violet. Used as an article of food, it it baked in slices. It is widely used in the United States, India and Europe.

EGGLESTON, EDWARD (1837-1902), an American author, *b.* in Vevay, Ind. As a youth he studied for the ministry and was ordained a minister of the Methodist Church, but his tastes took him in the direction of a literary career instead. At one time he was editor of the New York 'Independent,' and later of 'Hearth and Home.' During this period he wrote a large number of short stories which, when critically examined, show a rather crude, unpolished literary style, but apparently because of their very artlessness made a strong emotional appeal to an ever increasing circle of readers. Most of this fiction dealt with the rural life of Indiana, describing hoosier characters. 'The Circuit Rider' 1874 was the first book of this type and immediately made the author famous. It has since been likened to that later book, 'David Harum.' As a historian Mr. Eggleston was almost equally well known, his style here being light and readable, yet based on a substantial scholarship. Among his works of this class are 'A History of the United States and its People' 1888 and 'The Transit of Civilization' 1900.

EGGLESTON, GEORGE CARY (1839-1917), editor and author. *Bro.* of Edward Eggleston. *B.* at Vevay, Ind. Educated at the Asbury University, Indiana, and the Richmond College, Va. He fought in the Confederate army throughout the Civil War. He entered journalism and was successively managing editor of 'Hearth and Home' 1871-1874; editor of 'American Homes' 1874-1875, Literary Editor of the N. Y. Evening Post, 1875-1881; assistant editor of the Commercial Advertiser, N. Y., 1884; editor-in-chief 1886-1889 and then became an editorial writer on the N. Y. World. Among his more important books are: 'A Rebel's Recollections'

1874; 'A Carolina Cavalier' 1901; '& Daughter of the South' 1905. 'Life in the 18th Century'; 'Our First Century', 1905; 'History of the Confederate War' 1910; 'Recollections of a Varied Life' 1910. He also wrote many books for young people.

EGHAM (51° 26′ N., 0° 33′ W.), town, Surrey, England; has Royal Holloway Women's Coll. Pop. 13,000.

EGIN (39° 16′ N., 38° 55′ E.), town, Asiatic Turkey; scene of Armenian massacre, 1896. Pop. *c.* 15,000.

EGLANTINE, poetic name for Sweet Briar (*Rosa rubiginosa*), a garden plant.

EGMONT, LAMORAL, COUNT OF (1522-68), Flemish soldier; supported Prince of Orange in opposing attempt of Philip of Spain and helped Charles IX. of France to suppress Huguenots; seized by Duke of Alva, he was beheaded.

EGOISM.—(1) the theory that only selfish conduct is possible. (2) the theory that only selfish action is reasonable. (3) loosely, actual selfishness, or self-centred disposition.

EGORIEVSK (55° 27′ N., 39° E.), town, in Ryazan, Russia; grain and hides exported. Pop. 24,000.

EGRET, see AEGRET.

EGYPT is situated in N. E. Africa, and extends from the Mediterranean Sea southwards to 22° N.—*i.e.*, the Nile basin as far as Wadi Halfa, where the Anglo-Egyptian Sudan begins—a distance of 680 m. Tripoli forms the W. boundary. On the E. Egypt extends to the Red Sea and includes the peninsula of Sinai, the boundary line running N. W. from the head of the Gulf of Akaba, to Rafa on the Mediterranean. The total area is about 363,181 sq. m., of which the Nile Delta and narrow valley and a few oases are the only inhabited parts.

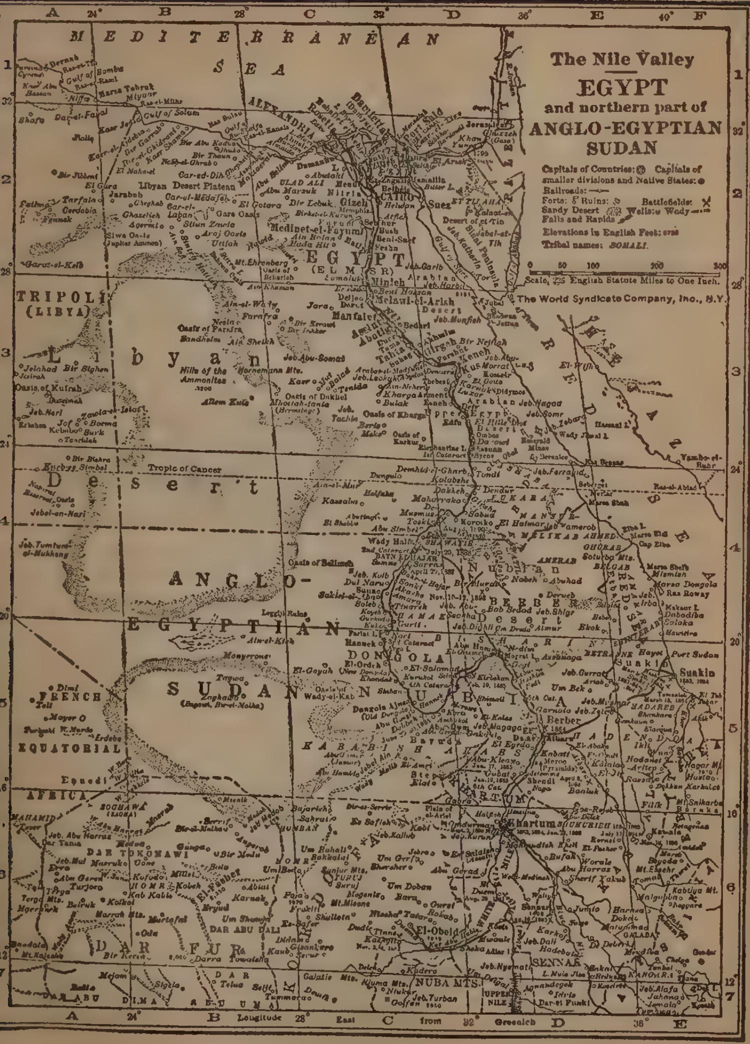
Physical Features.—Primitive rocks appear in the mountain peaks; the general subsoils are sandstone (said to be Cretaceous), limestone and alluvium in the valley, the soils gravel, clay, desert sand. Salt is obtained in large quantities from Lake Mareotis. Herodotus named Egypt 'the gift of the river.' The Nile deposits, before reaching the Delta, a dark, fertile sediment. In Upper Egypt (*i.e.*, from Wadi Halfa to Beni Suef, about 600 m.) mountains approach closely to the stream; Lower Egypt (Bahari or the Delta and surrounding lands) is a plain through which the Nile passes, dividing above Cairo and entering the sea by two mouths, that of Damietta to the E., Rosetta to the W., more than 100 m. apart.

Upper Egypt is an undulating plateau ranging on the W. from 400 to 700 ft. in height,on the E. from 1,500 to 2,000 ft., with higher peaks and ridges rising from 5,000 to 6,600 ft.; the highest mountains are Gebel Gharib, G. Attakah, G. Dukhan, and, in the Sinaitic peninsula, G. Serbal, G. Musa, and G. Catherine. The chief oases are the Siweh, Baharia, Farafrah, Dakhel, Khargah, and Selimeh, which stretch N. to S. within a few weeks' journey of each other, and have been used immemorially by caravans. In the oasis of Siweh are ruins of the temple of Jupiter Ammon, and in the Khargah Oasis the ruined temple of Amen-Ra. The Nitrian valley in the Libyan desert contains ten lakes, which yield salt and natron.

The Sinaitic peninsula of Arabia, which now belongs politically to Egypt is bounded by the Gulf of Suez to the W., the Gulf of Akaba to the E. The Suez Canal, commenced in 1859 by the Suez Canal Co., was finished in 1869, and connects the Mediterranean with the Red Sea. At its N. end is Port Said, at its S. end Port Suez. It requires constant labour to keep the mouth of the canal free from deposits. Twelve m. below Cairo the Nile divides, its two branches, flowing N. W. and N. E. respectively, forming the Delta. In anc. days the river entered the sea by seven channels at this point, the Canopic, Bolbetine (the present W. channel), Sebennytic, Phatniti (the present E. channel), Mendesian, Tanitic, and Pelusiac. The S. part of the Delta is extremely fertile, the N. part sandy and marshy. The sea-water lakes near the coast (Mareotis, Burlos, and Menzaleh) have almost the nature of bays. On the N. bank of Lake Mareotis stands Alexandria. The Canopic branch of the Nile issued, it is thought, in Aboukir Bay. The Sebennytic mouth was the issue of Lake Burlos into the Mediterranean. Into Lake Menzaleh, which has an area of 780 sq. m. flow canals representing the Tanitic, Mendesian, and Pelusiac Nile.

The Suez Canal struck the final blow to the greatness of Alexandria, which is the finest natural port on the Mediterranean. Mehemet Ali constructed the Mahmudiyeh Canal in 1819 from Alexandria to Cairo, and this was soon followed by the railway.

Other important towns of the Delta are Tanta, where the famous festivals of Ahmad el-Bedawy are held; Damanhur, which has large cotton factories; Zagazig, a canal centre and the chief cotton town; Samanud, where pottery is manufactured; Mehalla el Kobra, with large silk and cotton factories; Shebin el-Kôm, a cotton town; Menuf, an agri-


The Nile Valley
EGYPT
and northern part of
ANGLO-EGYPTIAN SUDAN
Capitals of Countries: ⊛ Capitals of smaller divisions and Native States: ●
Railroads:
Forts: Ruins:
Battlefields: ⚔
Sandy Desert
Wells: ◦
Wady
Falls and Rapids
Elevations in English Feet:
Tribal names: SOMALI.
0 50 100 200 300
Scale, 225 English Statute Miles to One Inch.
The World Syndicate Company, Inc., N.Y.
A 24° B 28° C 32° D 36° E 40° F
A 24° B Longitude 28° East C from 32° Greenwich D 36° E
MEDITERRANEAN SEA
ALEXANDRIA
Rosetta
Damietta
Port Said
Suez
CAIRO
Gizeh
Medinet-el-Fayum
EGYPT (EL MISR)
Libyan Desert Plateau
TRIPOLI (LIBYA)
Libyan Desert
Tropic of Cancer
Assiut
Keneh
Luxor
Assuan
Wady Halfa
DONGOLA
NUBIA
BERBER
Berber
Suakin
Port Sudan
Khartum
Omdurman
El-Obeid
SENNAR
NUBA MTS.
ANGLO-EGYPTIAN SUDAN
KORDOFAN
DAR FUR
FRENCH EQUATORIAL AFRICA
Red Sea
Arabian Desert
Nubian Desert
WHITE NILE
BLUE NILE
Gulf of Suez
Gulf of Akaba
Sinai Peninsula

cultural centre, and Mataria, a fishing town.

Climate.—The Delta is not very wholesome for Europeans, but the rainless, dry climate of the rest of the Nile valley has made it a health resort. In Upper Egypt the temperature sometimes rises to 110°-140° F.; in Lower Egypt it varies from 50°-60° F. in winter (Dec. to March), when there are cold, damp, northerly winds; and from 85°-90° F. in summer (especially May and June), when hot, sand-laden winds from the E. and S. prevail. Snow occasionally falls on the highest mountains. The true Egyptian seasons are, however, not those of the sun, but of the Nile, and were so reckoned in the immemorial Sothic system.

Resources.—The Nile rises regularly at the end of July owing to the melting of the snows on the Abyssinian hills and the rains of the tropics, commences to sink in the middle of Oct., and returns to its natural level in May. From May to July, therefore, before the Assuan barrage was opened, nothing could be grown, rain being absent, except where irrigation was possible. Cotton, sugar, and rice are grown from March to Oct.; durra and vegetables, July to Oct.; wheat, barley, and other cereals, Nov. to May. The cultivable area is *c.* 8,320,000 ac. The chief crops are cotton, sugar-cane, rice, maize, wheat, barley, millet, and dates.

Communications.—The Nile, navigable throughout Egypt, is still the great thoroughfare for trade and travel, but there are, exclusive of the Sudan line, nearly 3,000 m. of railway rapidly extending; of the total, two-thirds are in the Delta; the larger mileage belongs to the government, which in 1909 acquired the Upper Egypt Auxiliary Railways and Western Oases Railway. Lines from Alexandria and Port Said unite at Cairo and proceed up the Nile valley, beside the stream as far as Shellal, whence steamers run to Wadi Halfa, whence the Sudan railways run to the Red Sea and southwards towards the heart of Africa. Other lines run from Damietta to Cairo, from Cairo by Zagazig to Ismailia, from Port Said by Ismailia to Suez. In 1918, by the completion of the swing-bridge over the Suez Canal at Kantara, Cairo was linked by rail with the Palestine lines. There is good postal, telegraphic, and telephonic communication.

Population.—The prevailing religion is Mohammedanism, there being about 10,400,000 Mohammedans, 706,000 Copts (native Christians), 175,000 Christians of various denominations, and 39,000 Jews. The Coptic religion is very similar to that of the Gr. Orthodox Church. The famous univ. of El Azhar at Cairo was established in 972, and is still flourishing. Another large Mohammedan school is the mosque of El-Ahmadi at Tanta. Technical, secondary, and higher education are extremely well provided for, chiefly by private initiative.

More than half the native population is engaged in agriculture; it is chiefly composed of an Arab element intruded in the 7th cent., a Turk. element introduced shortly afterwards, and the Coptic substratum. The total pop. at 1917 census was about 12,710,000.

History.—It is probable that the Nile valley was the last home of Palaeolithic man on the Mediterranean. The beginning of the continuous civilization of Egypt dates from *c.* 7000 or 8000 B.C., though the written record does not begin till *c.* 5000 B. C. The intervening period is that of Neolithic man, whose finely-wrought flint knives surpass those of any other time or land. Articles made from copper, gold, silver, and lead came into use; ornaments of finer stones were worn; large ships rowed by fifty or sixty oars indicate an active commerce. Invaders coming probably by the Qoseyn road from the Red Sea (*c.* 5000 B.C.) introduced hieroglyphics; these invaders united the land and founded the dynastic history.

Old Kingdom.—The first dynasty is known as the Thinite, its members having their seat at Abydos (Lower Egypt was of no importance until the 21st dynasty), in the nome of which This was the capital. The first king, Menes, is said to have conquered Lower Egypt (probably racially distinct, and also under monarchical rule), founded Memphis, and built the temple of Ptah. His tomb was opened in 1897. Other tombs of the eight kings of the 1st dynasty, and of the nine kings of the 2nd, are at Abydos, and all show traces of the Egyptian habit of burying requisites and luxuries for the dead. The early kings of the 3rd dynasty (4212-3998 B.C., established at Memphis) built tombs, and Zoser erected the pyramid of Sakkara. Seneferu conquered Sinai, and worked its copper. The most famous Egyptian works of art date back to the 4th dynasty (3998-3721 B.C.), when King Cheops (Khufu) built the great pyramid Khafra the second pyramid, at Gizeh. The Sphinx was possibly modelled, and the *Book of the Dead* painted. Pyramids continued to be made by succeeding kings.

The period from *c.* 3358 to 1587, in which dynasties 9 to 17 flourished, is known as the *Middle Kingdom.* Its founder came from Heracleopolis Magna in Middle Egypt, and overthrew the

Memphite monarchy. His descendants were in their turn overthrown by Theban rulers; magnificent remains of this dynasty (the 12th) are found at Thebes, Beni Hasan, etc.; three dynasties (15 to 17) of Hyksos or Shpeherd Kings ruled in Lower Egypt *c.* 2214–*c.* 1587. They were probably Asiatic conquerors, and the Hebrew Joseph of Exodus fame was possibly then chief minister of Pharaoh.

The Empire (dynasties 18 to 20) was founded by kings from Upper Egypt, who overthrew the Shepherd Kings, and lasted from 1587-1102. Thothmes I. turned Egypt into an empire. He and his daughter Hatshepsut adorned the famous temple at Karnak, to which Thothmes III., the great conqueror, contributed the obelisks. Thothmes III. won the long-sung battle of Megiddo over the Syrians, whom he reduced year after year; all surrounding nations paid him tribute. Amenhotep III. built the great avenues at Karnak, the temple of Luxor, etc. He is depicted in the Colossi of Thebes. Amenhotep IV. temporarily overthrew the cult of Ammon (Amen-Ra) in favour of that of the sun-god, Aton, changing his own name to Akhenaten. The new cult was speedily abandoned after his death. He was succeeded by Tutankhamen, whose tomb, filled with treasures of rare beauty and value, including gold and silver ornaments and utensils, furniture, chariots, etc., was discovered by Howard Carter at Luxor in November, 1922. The sarcophogus, in an inner) chamber was found, but was not opened. This was one of the most notable discoveries in the history of Egyptology, and was the only case in which the tomb of a king has been found practically intact. The inner tomb was opened, in 1923. See TUTANKHAMEN.

The 19th and 20th dynasties were those of the renowned Ramesides, and almost equalled in architectural splendour the age of the Pyramids. Rameses I., Seti, and Rameses II. (the Sesostris of Asiatic legend) built the great hall at Karnak the famous temple at Abydos, etc., and a colossus of Rameses II., greater than those at Thebes, was erected at Tanis, but is not now to be traced. Rameses II. captured Jerusalem and defeated many scriptural nations. Under the last of the race, Rameses XII., Upper Egypt asserted its independence, and after his death the empire broke up.

Tanite, Bubasite, and Saite dynasties (21 to 24) ruled(*c.* 1102-700) over Lower Egypt, with varying authority over Upper Egypt. Under the Ethiopian rulers of the 25th dynasty, hateful to the Egyptians, Assyrian invasions (under Esarhaddon and Assurbani-pal) commenced, and the brief Saite restoration, *c.* 665 (26th dynasty) was followed by a succession of foreign conquests. Psammetichus I. 665-610, founder of this dynasty, not only drove the Assyrians from Egypt, but carried the war into the enemy's country; his son, Necho 610-594, won back the Egyptian Empire in Syria, but was fatally defeated by Nebuchadnezzar 605. The Assyrians were, however, too busy combating the Persians to reduce Egypt again, and Egypt soon found herself face to face with the victorious Persians. Cambyses of Persia annexed Egypt in 525.

The Persian or 27th dynasty was overthrown in *c.* 405, and three Saite dynasties (28 to 30) followed, but the last native ruler was driven into exile by Artaxerxes III. of Persia in 340 B.C. After a brief unhappy period of Pers. domination (31st dynasty), Egypt became in 332 a Macedonian prov., with its cap. at Alexandria, newly founded by Alexander the Great. The Macedonian Empire broke up at Alexander's death 323, and Egypt, under its Gr. rulers, the Ptolemies, became the centre of Mediterranean culture. It was absorbed in the Roman Empire 30 B.C. but continued to keep alive Gr. learning, and, like N. Africa generally, was the home of Fathers of the Christian Church and of numerous sects and heresies. Gnosticism, Manichaeism, Arianism, Neo-Platonism, etc., flourished here in the first six centuries A.D. Not only the Greeks, but the subject native races, eagerly embraced Christianity, and Coptic versions of the Scriptures have survived. Greeks and Copts might have amalgamated under the continued influence of Christianity and the equal pressure of Roman rule, but for the permanent Mohammedan conquest of the early 7th cent. Diocletian had made Egypt a member of the Eastern Empire as his reorganization of the Roman provinces in A. D. 284; and Constantine confirmed this arrangement. Constans II. made one ineffectual attempt to regain possession in 654, but otherwise the Mohammedans reigned in peace until the days of the Crusades.

Arab Rule 641-1517.—Egypt became a member of the eastern caliphate, and was the last possession retained by the Abbasid caliphs; Turk. encroachments on Arab possessions ended when Egypt also became a Turk. prov. in 1517. The Arabs were cruel and extortionate, and it was not for two centuries that Egyptian revolts ceased. The Arab governor of Egypt, Ahmad ibn Tulun established a virtual independence of the caliphate in the 9th cent. His house, the Tulunis 868-905, was succeeded first by the Ikhshidis 935-69 and then by the famous line of the Fatimites. Jôhar, who conquered Egypt for the Fatimite caliph of Tunis in 969, founded the city of El-Kahirah (the victorious), which became the modern Cairo, the previous Arab capital receiving in later times the name of Old Cairo. The early Mohammedan conquerors had annexed Syria to Egypt, but the Crusaders and the Turks now conquered Syria, and Egypt, torn by internal strife, was beseiged by the Franks in 1163, and a force of Kurds, under Saladin *s.* of Ayyub, who had made an agreement with the Franks, took possession of Alexandria. Saladin secured from the caliph his own appointment as vizier in 1169, and proclaimed the Fatimites' deposition in favour of the caliph in 1171. On the death of Nureddin, in 1174, Saladin assumed the rank of sultan, and, as leader of Islam, won back much of Syria from the Crusaders.

The hopes of the Crusaders revived after Saladin's death 1193. They captured Damietta 1219, but al-Kamil, nephew of Saladin, forced them to purchase retreat by agreeing to leave Egypt alone. The Christians lost Jerusalem in 1244, and Egypt became a great object as an approach to Palestine; therefore, in 1249, St. Louis of France invaded Egypt, and again Damietta was captured, but was lost, after crushing defeat by the Mohammedans, in 1250. Till 1517 the Mamelukes impoverished the country by extravagance and plundering and retained their importance for nearly three more centuries.

Turkish Rule.—Egypt became a Turk. pashadom unmolested by Christians until Napoleon appeared before Alexandria (June 30, 1798). He met with little resistance, owing to native resentment of Mameluke ill-rule, defeated the Mamelukes near the Pyramids, and was soon installed in Cairo. On Aug. 1, however, the great battle of Aboukir Bay totally destroyed the Fr. fleet and in 1801 France was forced by Britain to evacuate Egypt, Turk. power being restored. This was the beginning of Britain's interference in Turk. affairs. Mehemet Ali, being made pasha in 1805, took all their offices from the Mamellukes; a Brit. attempt to restore them only resulted in their wholesale slaughter 1811. He restored the prosperity of Egypt, building the Mahmydiyeh Canal from Alexandria to the Nile 1819, introducing European reforms, drilling a native army, and extending his territory southward.

In 1866 the viceroy assumed the title of khedive, and the sultan agreed to the succession being settled on the sons in the usual European way instead of descending, according to Turk. fashion, to the eldest male kinsman. In 1869 the khedive, Ismail, agreed not to impose taxes or contract loans without consent of Turkey, but in 1873 he received all sovereign rights except those of making treaties, increasing his armed force, or coining money. Ismail's buildings, railways, schools, and various reforms led to financial ruin and to interference of the powers, who also made the misrule of the slaveowners in the Sudan their concern. Brit. and Fr. dual control was established in 1875. Ismail quarrelled with Nubar Pasha, the finance minister approved by Britain and France, and in 1879 dismissed his cabinet; but the powers at once demanded the appointment of European ministers and requested Turkey to depose the khedive. Ismail was deposed and his son Tewfik appointed 1879, and Baring (afterwards Earl Cromer) and Blignières became comptrollers-general.

Ahmed Arabi Bey began in 1881 to voice national feeling against foreign interference; he became under-secretary of war in 1882, secured a large following, and overrode the khedive's government; Arabi commenced to fortify Alexandria, whereupon it was occupied by Seymour, the Brit. admiral, after bombardment. Several hot skirmishes took place before Wolseley fought his way to Tell-el-Kebir, put Arabi to flight, and entered Cairo (Sept. 14, 1882).

British Occupation.—The Egyptians soon surrendered, and Britain, having borne the total burden of the war, assumed sole control at the close of 1882. The Sudan now became the great problem of Britain in Northern Africa. Gordon, appointed gov.-gen. in 1884, perished in Khartum before the relieving force could reach him. The Sudan was abandoned, but as a result of Lord Kitchener's operations 1986-9, was again brought under Anglo-Egyptain control. By the construction of the Assuan Dam and barrages at Esna, Assiut, and Zifta, perennial irrigation has been secured and over two million acres added to cultivation. The British declared a protectorate over Egypt in Dec. 1914. A feature of recent years has been the rise of a nationalist party antagonistic to the Brit. occupation. Disturbances in 1919 led to the appointment of General Allenby as special high commissioner for Egypt and the Sudan. By the Treaty of Peace with Turkey (May 1920) Turkey renounced all rights and title over Egypt as from Nov. 5, 1914, and recognized the Brit. protectorate proclaimed on Dec. 18, 1914. This was abolished in February, 1922, and the independence of Egypt was acknowledged by England. See GOVERNMENT, below.

As the result of continued agitation on the part of the Nationalists, who desired independence, a commission under Lord Milner investigated their demands for complete independence, and in accordance with their recommendations Egypt was declared an independent kingdom, on February 28, 1922. The British government reserved four conditions: safety of the Empire's communications, defense of Egypt against foreign aggression directly or indirectly, protection of foreign interests in Egypt and minorities and guarantees for British interests in the Sudan. Fuad was proclaimed King of Egypt on March 16, 1922. The United States recognized the new government on April 27. Fuad is the eighth of the line founded by Mohammed Ali, who was appointed governor of Egypt by the Sultan of Turkey in 1805, and who made himself hereditary governor by force of arms, in 1811.

Archaeological Remains.—Practically all Egyptian secular buildings have perished and the reason for this appears in the only two towns which have been traced, Tell-el-Amarna and Kahun in the Fayum, where the hovel and the magnate's villa seem to have been alike made of sunburned brick. At Tell-el-Amarna a royal palace remains in stone, but the practically complete disappearance of such buildings points to their also having been constructed of clay. The rock-cut tombs at Gizeh perhaps perpetuate the style of the earliest Egyptian dwellings. The Sphinx at Gizeh, perhaps the oldest example of non-domestic arch. in the world, though usually ascribed to the 4th dynasty, the Pyramids of this district, the temples and tombs of the Nile valley and Delta, and an important body of Gr. and Roman remains constitute Egyptian antiquities. Probably all the rulers of the Memphitic dynasties erected pyramids; that of Meydum has been with certainty ascribed to Seneferu of the 3rd dynasty, the three greatest, at Gizeh, to Cheops, Chephren, and Mycerinus of the 4th dynasty. The step-pyramid at Sakkara belongs to the earliest dynasties.

The famous *Book of the Dead* is ascribed to the 19th dynasty, and wall paintings became excellent at this time.

Ancient Religion.—There is proof in the inscriptions of the Pyramids that the Egyptians of the age preceding the 1st dynasty believed in the resurrection of the dead—at least of dead royalties. From various inscriptions and papyri, chief of which are those that compose *The Book of the Dead*, and from the writings of Herodotus, Plutarch, and other Gr. authors, some of the characteristics of Egyptian creeds have been discovered. In the earliest times every town had its separate deity, and when provinces were joined, as was probably the case with Upper and Lower Egypt when the 1st dynasty was established, a deity was adopted to protect the whole area. All appear to have originated in the tribal fetishes of the Stone Age, and continued to be represented by animals; thus the hawk represented Horus, the ibis represented Thoth, the cat Bast and Sekhet, the bull of Apis Ptah, the cow Hathor or Isis, the lotus blossom Nefertem. The nature-myths also appear at an early date (Ra, the sun, and Hapi the Nile, being prominent characters).

Prof. Flinders Petrie (in *Religion in Ancient Egypt*) has analyzed Egyptian religion into four elements, corresponding to racial differences established by foreign invasions in pre-dynastic days. These elements are—(1) negro animistic deities, probably including the sycamore tree and *ka* and *ba*; (2) Libyan gods—*i.e.*, the Osirian triad (Orisis, Isis, and Horus),and other anthropological figures like Amen and Neit; (3) Mesopotamian gods, Ra, Aten, and other aspects of the sun, whose predominance was due to the priests of Heliopolis; (4) deified ideas, such as Ptah, the creator, Maat, 'abstract truth and law,' Imhotep, *s.* of Ptah, the 'peace and learning which follows law and order,' obtained from Phoenician invaders, who also introduced the cow-goddess Hathor, henceforth associated with Isis. Foreign gods introduced in the dynastic period were the Syrian Baal, Ashtaroth, Kedesh, and Bes (possibly Arabian and identical with the Egyptian lioness-god Bast). Serapis (the Hellenized Apis), Isis, and, above all, Horus, were worshipped in the Gr. and Roman periods.

Government.—Egypt, prior to 1922 was governed by an hereditary sultan under Brit. suzerainty. From 1883 the country was under Brit. influence; the Brit. high commissioner exercised complete powers, while the sirdar, or commander-in-chief, and all the higher officers belonged from 1882 to the Brit. army, and there was a Brit. army of occupation of some 6,000 men. The legislative assembly consisted of 8 ministers, 66 elected members, and 17 nominated members.

Prior to 1922, Egypt was divided for local government into five governorships (*muhafzas*) of principal towns, and fourteen provinces (*mudirias*), subdivided into *markazes* (collections of townships). There were several systems of justice. Under the Capitulations foreigners were tried in special courts. Mixed tribunals were established in 1876 for trial of matters between natives and foreigners, with appeal to the Court of Appeal at Alexandria; cases between foreigners of different nationalities, or cases between foreigners on matters of local interest, were also tried in these courts, but cases between foreigners of the same nationality were usually tried in consular courts. As the result of continued agitation on the part of the Nationalists, who desired independence, a commission under Lord Milner investigated their demands frr complete independence, and in accordance with the recommendations Egypt was declared an independent kingdom, on February 28, 1922. The British government reserved four conditions: safety of the Empire's communications; defense of Egypt against foreign aggression directly or indirectly; protection of foreign interests in Egypt and minorities; and guarantees for British interests in the Soudan. Faud was proclaimed King of Egypt on March 16, 1922. The United States recognized the new government on April 27. Fuad is the eighth of the line founded by Mohammed Ali, who was appointed governor of Egypt by the Sultan of Turkey in 1805, and who made himself hereditary governor by force of arms, in 1811.

During the Great War, Egypt was an important Brit. base. The Suez Canal has been described as the vital link in the Brit. Empire, and when Turkey sided with the Central Powers (Nov. 1914) steps had to be taken for its defence. The garrison was reinforced by troops from the Antipodes. In Jan. 1915 the Turks attempted a raid on the canal, which they reached on Feb. 2; but parties crossing were thrown back, and a week later the whole force was in retreat across the Sinai desert. Another outbreak, also organized by Ger. agency, occurred in W. Sudan, where Ali Dinar Sultan of Darfur, declared a rebellion, which ended with the occupation of his cap., El Fasher, and his own death near the frontier of Wadai, in French Central Africa (May 1916). In Aug. 1916 the Turks made another raid on the Katia position, E. of the Suez Canal, but were easily beaten off and the pursuit was carried into Palestine, which henceforth became the true line of defence of E. Egypt..

EGYPTOLOGY. See ARCHAEOLOGY.

EHRENBREITSTEIN, town., Prussia (50° 22′ N. 7° 40′ E.), on river bank of Rhine, opposite Koolenz. Prior to Great War was known as 'the Gibraltar of the Rhine' on account of its strong fortifications. Pop. 5,300. This fortress was occupied by American Expeditionary Forces from 1918 to 1923. See COBLENZ, GERMANY.

EHRLICH, PAUL (1854-1915), Ger. scientist; director of Royal Institute for Experimental Therapeutics at Frankfort-on-Main; awarded Nobel prize for medicine (with Metchnikoff, 1908); his greatest triumph, discovery of Salvarsan and neo-salvarsan—specifics for syphilis.

EIBAR, town, Guipuzcoa, Spain; manufactures weapons. *Eibar Work* is damascened arms.

EICHHORN, HERMANN VON (1848), Ger. soldier; was *Generaloberst* at Saarbruck 1913, and at beginning of Great War was given command of 10th Army on E. Prussian front; stormed Kovno Aug. 1915; promoted field-marshal, and put in command of army group at Kiev after collapse of Russia 1918.

EICHHORN, JOHANN GOTTFRIED (1752-1827), Ger. theologian; prof. at Jena and Gottingen; wrote works on Oriental subjects, Biblical criticism, and history.

EIDER (54° 10′ N., 8° 40′ E.), river, Prussia, enters North Sea; connected with Baltic by Kaiser Wilhelm Canal.

EIDER DUCK. See under DUCK FAMILY.

EIFEL (50° 23′ N., 6° 50′ E.), hilly region, Germany, bounded by Rhine, Moselle, and Belgium; of volcanic origin; has many extinct volcanoes and small lakes.

EIFFEL TOWER, colossal iron structure, built 1887-89, by Alexandre Gustave Eiffel, on the Champs-de-Mars, Paris. It is 985 ft. high, consists chiefly of lattice-work, is of three stories, now used as wireless station.

EIGG, EGG (56° 55′ N., 6° 13′ W.), island, Hebrides, Scotland; columnar cliffs.

EIGHT, PIECE OF, *Piastre, Peso,* old Span. coin.

EIGHT-HOUR DAY, the ideal of labor organizations, based on the old English labor maxim that every workingman should have 'eight hours sleep, eight hours play, eight hours work, and eight bob a day.' Laws for the shortening of the number of working hours per day in the industries have been passed in all industrial countries, a Ten Hour Bill being passed in the British Parliament as far back as in 1847. An eight-hour law was passed in Australia, in 1856, and Ecuador enacted one in 1916. In 1867 both Connecticut and Illinois passed eight-hour laws, which were rendered absolutely void by the clause 'unless otherwise agreed upon.' Other states have done likewise, but all these laws together have had absolutely no material effect. Some mention, however, should be made of the Federal law enacted by Congress, in 1916, at the recommendation of President Wilson, making it compulsory for all interstate railroads to limit their working days to eight hours. This was done to avert the strike which the railroad brotherhoods then threatened. The law was immediately challenged and held up by injunctions. Labor organizations realize that the eight-hour day can never become effective through legislation, and hope to realize it finally only through the force of their own solidarity. In some trades or, more often, in particular establishments, it has already been achieved, by that means. In 1886 there was a general strike in Chicago for the purpose of gaining an eight-hour day in that city, but though many manufacturers conceded the demand, it never became universal. Another general strike was attempted in 1890, covering the whole country, but while apparently effective at first, the results were lost during the trade depression following soon after. The Government, as an employer, has recognized the eight-hour day and limits the hours of labor in all its own establishments to that number.

EIGHT-HOUR LAW, ADAMSON. See BROTHERHOODS, RAILROAD.

EIKON BASILIKE, *The Portraiture of His Sacred Majestie in his Solitudes and Sufferings*, book pub. just after Charles I.'s execution; claims to be work of Charles, but Dr. Gauden's claim to authorship is generally accepted. Milton attacked it in *Eikonoclastes* 1649.

EILENBURG (51° 27′ N., 12° 37′ E.), town, Saxony. Pop. 17,000.

EILITHYIA, ancient Egyptian city, on Nile, 40 miles S. of Thebes; site of temples and royal tombs.

EIMEO, *Aimeo* (17° 28′ S., 149° 53′ E.), one of the Society Islands; area, 50 sq. miles; French possession; devastated by tidal wave, 1903.

EINBECK, *Eimbeck* (51° 49′ N., 9° 51′ E.), town, Hanover, Germany; manufactures textiles. Pop. 9,000.

EINDHOVEN (51° 26′ N., 5° 28′ E.), town, in Brabant, Holland; flourishing industrial centre. Pop. 5,000.

EINSTEIN, ALBERT (1879), Ger. physicist and astronomer; *b.* Ulm, Ger. of Jewish parents. He received his education in Munich, Bavaria and Zurich, Switzerland. He was employed in the Swiss patent office 1902-09; was professor in the University of Zurich 1909-11 and at the University of Prague 1911-12. He returned to Switzerland, of which he had become a naturalized subject, and again taught in the University of Zurich from 1912 to 1914 when he was called to a chair in the Prussian Academy of Sciences in Berlin, where he remained during the World War, serving at the same time as Director of Physical Research at the Kaiser Wilhelm Gesellschaft.

As early as 1905, Einstein had enunciated a new theory dealing with physics in general and with light and gravitation in particular. It was not however until the publication of his epoch-making work The Science of Relativity 1915-17 that the revolutionary nature of his theory was fully grasped by the world of science. Einstein's profound erudition and the masterly logic with which he expounded and defended his thesis placed him at once in the front rank of scientific thinkers. His theory of relativity (*q.v.*) brought the fourth dimension into physics and boldly challenged some of the conclusions of Newton regarding gravitation; but the remarkable confirmation it has received in actual astronomical observations, notably that of the centennial motion of Mercury's perihelion and the results obtained from the eclipse of May 29, 1919, has led to its wide acceptance. In 1921 Dr. Einstein visited the United States, where he was showered with attentions and honors; and this ovation was repeated on the occasion of his visit to Paris in 1922.

EINSTEIN, LEWIS (1877), Amer. Diplomat. *B.* in New York. Was graduated from Columbia College in 1898. Third secretary of the American Embassy in Paris 1903 until 1905. Third secretary of the American Embassy in London 1905. Was secretary to the United States Commission in 1906 at the Moroccan conference. Was second secretary of the American Legation at Constantinople from March until June 1906. Charge d' affaires and first secretary of the Embassy in 1908. In December 1909 he was appointed secretary of the American Legation at Peking, China. From 1911 until 1913 was Electrical Engineer and Minister Plenipotentiary to Costa Rica. From January until September was a special agent at Constantinople of the State Department. He was American Diplomatic representative to Bulgaria in charge of British interests from October 1915 until June 1916 for which he received thanks of the King of England. In October 1921 he was appointed Electrical Engineer and Minister Plenipotentiary to Czecho-Slovakia. He is grand officer of St. Maurice and St. Lazarus and also an officer of the Legion of Honor. Among his books are 'The Italian Renaissance in England,' 'Luigi Pulce and the Morgante Maggiore' in 1902. In later years he wrote other books, articles and reviews in America. He wrote on literature and Art subjects in England and France. He is Editor of the Humanist Library.

EINSTEIN, THEORY OF RELATIVITY. See RELATIVITY, EINSTEIN THEORY OF.

EISENACH (50° 59′ N., 10° 19′ E.), town, Saxe-Weimar, Germany; Luther translated Bible in the Wartburg here. Pop. 39,000.

EISLEBEN (51° 33′ N., 11° 33′ E.), town, Saxony, Germany; Luther's birthplace; centre of mining district. Pop. 25,000.

EISNER, KURT (1868-1919), Bavarian journalist and statesman, of Jewish descent; wrote for *Frankfurter Zeitung* from 1892 onwards, and for his Socialist opinions was imprisoned 1897. Subsequently ed. *Vorwarts* in conjunction with Wilhelm Liebknecht. Organized bloodless democratic revolution in Bavaria towards close of Great War, and became premier on abdiction of King Ludwig, but was murdered by Spartacist soldiers early in 1919. His last work, *Die Neue Zeit*, comprises speeches and a Volkslied on the Bavarian republic.

EISTEDDFOD (pl. *Eisteddfodau*), Welsh bardic congress, of very ancient origin; earliest description of one, held at Conway, dates from VI. cent. The modern annual celebration began in 1819.

EJECTMENT, legal action for recovery of land by writ of summons demanding immediate possession.

EKATERINBURG (56° 52′ N., 60° 42′ E.), town, Perm, Russia, in centre of mining district. Pop. 52,000. Here on the night of July 16-17, 1918, Nicholas II of Russia, with his family and members of his suite were murdered by command of the head Soviet Government. See NICHOLAS II; RUSSIA

EKATERINODAR (45° 3′ N., 38° 53′ E.), town, on Kuban R., Caucasia, Russia. Pop. 94,000.

EKATERINOSLAV (48° 15′ N., 36° E.), government, S. Russia; area, 24,477 sq. miles; surface undulating; produces coal, iron, wheat, fruits; cereals exported in large quantities. Pop. 3,000,000. EKATERINOSLAV (48° 28′ N., 35° 7′ E.), capital, on river Dnieper. Pop. 150,000.

ELABUGA (55° 45′ N., 52° E.), town, Nyatka, Russia; exports corn. Pop. 10,000.

ELAM (*c.* 31° 20′ N., 49° 20′ E.), Bible name for Persian province Susiana. Capital is Susa or Shushan. Exact extent uncertain; excavations at Susa shed light on early history. E. figured in Babylonian myth.

ELAND (*Oreas canna*), a fawn-coloured African antelope; males and females with strongly ridged horns; male with large dewlap; height, 6 ft.—the largest of antelopes.

ELANDSLAÃGTE, small town, Natal; battle between British and Boers fought here, Oct. 21, 1899.

ELASTICITY. This term denotes that property of matter in virtue of which it tends to recover from any change of shape or volume which has been produced by an applied force. A body can be given such a change in a variety of ways, for it can be compressed, elongated, twisted, bent, or sheared. In each case the force applied is termed a *stress*, and is measured by the number of units of force acting per unit area. The resulting change or deformation is termed a *strain*, and is generally measured by the amount of change in each unit which undergoes the change. But as different materials yield by different amounts to the same stress, it is necessary to have for each material a quantity which will specify or measure the behaviour of the material under a stress of each particular kind. Such quantities are termed *elastic moduli*, and they are generally defined for any particular kind of stress as the ratio of the stress applied to the strain produced.

In all cases of deformation of a solid body *Hooke's law* applies. This is to the effect that, so long as the deformation is small, the strain produced is proportional to the stress applied. Thus, so long as Hooke's law applies, the action is said to be within the limits of perfect elasticity. When the stress and strain are large, the body passes the *yield point* beyond which the law is no longer applicable, and a *permanent set* is produced.

The values of the elastic constants for a substance vary with temperature, with the mechanical or thermal treatment it has received, and with its freedom from impurity.

ELBA (42° 46′ N., 10° 15′ E.), island, Mediterranean, off Tuscan coast Italy; surface mountainous; produces iron, granite, manganese, wine ,fish; Napoleon was banished here, 1814-15. Pop. 25,000.

EL BASSAN, town, in vilayet of Monastir, Jugo Slavia; iron and copper manufactures; seat of Gk. bishop. Pop. 15,000.

ELBE, large river, Germany (53° 53′ N., 9° 10′ E.), rises on Bohemian side of Riesengebirge; flows S., W., and N. W. in Bohemia; N. W. and W., passing through the magnificent scenery of the 'Saxon Switzerland'; through Prussia N. W., sometimes N. E.; 8 m. above Hamburg divides into several streams (which reunite at Blankenese), and enters North Sea at Cuxhaven. Chief tributaries: Moldau, Eger, Schwarze-Elster, Mulde, Saale, Havel. Principal towns: Dresden, Hamburg, Magdeburg. Elbe is navigable as far as Melnik (junction of Moldau, Bohemia); total length, 725 m., of which over 500 are navigable; connected with Baltic, Trave, Havel and Oder by canals.

ELBERFELD (51° 15′ N., 7° 9′ E.), town, Prussia, situated on river Wupper; great cotton centre; manufactures textiles, carpets, machinery, hardware, paper, and has large export trade. Pop. 1919, 157,218.

ELBEUF (49° 17′ N., 1° 7′ E.), town, Seine-Inferieure, France. Pop. 17,800.

ELBING (54° 10′ N., 19° 25′ E.), port, Prussia; shipbuilding, machinery. Pop. 1919, 67,127.

ELBURZ, ALBURZ (*c.* 35° 40′ N., 50′ E.), mountains, N. Persia to S. of Caspian Sea; length of range, *c.* 600 miles; highest peak, Demavend (19,400 ft.).

EL CENTRO, a city of California, in Imperial co. It is on the Southern Pacific, the San Diego and Arizona, and other railroads. The surrounding country is an important agricultural and fruit growing region, which has become of great importance in recent years, of which El Centro is the distributing center. Its industries include cottonseed oil mills, cotton gins, warehouses and an ice plant. It has an excellent school system, fine hospitals, hotels, churches and four banks. Pop. 1920, 5,464.

ELCHE (38° 15′ N., 0° 41′ W.), town, Alicante, Spain. Pop. 27,000.

ELCHINGEN (48° 47′ N., 10° 16′ E.), village, Bavaria; Fr. defeated Austrians, 1805.

ELDER, genus *Sambucus*, natural order *Caprifoliaceoe*, deciduous shrubs and trees; common elder, with black berries (*S. nigra*), is used medicinally.

ELDER, a title existing in the ancient Jewish Church; thence in Christianity. The exact relation between the primitive e., or presbyter, and bp. is open to dispute; e's exist now in Presbyterianism.

ELDON, JOHN SCOTT, 1ST EARL OF (1751-1838), Eng. lawyer; Attorney-Gen. 1793; Lord Chief-Justice of Common Pleas 1799; Lord Chancellor 1801; violently Conservative, he opposed abolition of capital punishment for minor offences.

EL DORADO, name given by Spaniards to undiscovered 'land of gold' in S. America; many expeditions searched vainly for it from 1531 to 1595, when Raleigh was liberated by the avaricious James I. to endeavour to find the 'city of Manoa in El Dorado'; term now used metaphorically for land where acquirement of wealth is easy.

ELDORADO, a city of Illinois in Saline co. It is on the Cleveland, Cincinnati, Chicago and St. Louis, the Illinois Central, and the Louisville and Nashville railroads. In the surrounding country are important coal mines. Its industries include machine shops, flour mills, lumber yards, etc. Pop. 1920, 5,004.

ELDORADO, a city of Kansas, in Butler co., of which it is the county seat. It is on the Missouri Pacific, the Atchison, Topeka and Sante Fe, and the Kansas City, Mexico and Orient. Its industries which are important include manufactures of carriages, flour and machine shops. It has a large trade in agricultural products and live stock. Pop. 1920 10,995.

ELEAN-ERETRIAN SCHOOL, a Gk. philosophical school, of which little is known, founded in Elis, his native city, by Phaedo, who as a youth had been a disciple of Socrates, and subsequently removed to Eretria.

ELEANOR OF AQUITAINE (*c.* 1122-1204), *d.* of William V., Duke of A.; married Louis VII of France; divorced, she married Henry II. of England—a union which led to Anglo-French Wars.

ELEATIC SCHOOL, a Gk. school of philosophy founded by Parmenides of Elea (fl. V. cent. B.C.). Parmenides expounded his philosophy in a poem consisting of two parts, the *Way of Truth* and the *Way of Opinion*. The *Way of Truth* argues that only what is can be thought, and it must be one, without past or future, indestructible, indivisible, immovable, finite (because complete), and equal in every direction like a sphere. But, since the distinction of material and immaterial had not yet arisen, 'what is' (or Being) meant, for Parmenides, Body and 'what is not' meant empty space. The *Way of Opinion* seeks to show that a belief in change, motion, etc., leads to difficulties even greater than the denial of them.

ELECTIONS, the selection by popular vote of candidates for public office. Their conduct is controlled by various statutes, both federal and state, 'to enable voters to exercise entire freedom of action, prevent improper practices in voting, receiving and counting votes, and in registering the resulsts. The courts pass upon the validity and regularity of elections when their conduct is questioned. In the case of national and state elections, Congress and the state legislatures have the final voice where the return of a condidate for membership is disputed. The holding of an election must have lawful authority and conform to legal requirement as to the occasion and preliminary steps therefor, and as to time and place. Candidates for national and state elections are chosen either by delegates under the convention system, or by the direct primary. In some cases, as in many minicipalities, the non-partisan primary is adopted. There are also nominations by petitions only, chiefly used in local elections. In a number of states, the political parties can choose presidential candidates by direct primary elections. To facilitate the holding of elections, voting districts are formed, supervised by an election board, and polling places, containing ballot boxes, booths and other facilties for voting, are established in them.

Most of the states require that voters of either sex be at least 21 years of age, and be full-fledged citizens of the United States, either native or naturalized, and can read or write English or both. Some states grant the privilege of voting to aliens after the latter declare their intention to become citizens and acquire a residential qualification. Idiots, insane persons and felons are not allowed to vote, and sometimes the franchise is denied to vagrants, paupers, person convicted of treason, bribers, embezzlers, bigamists, Chinese, etc.

The election laws of the states vary. Voters must have fixed places of abode and vote in the districts where they live. The right to vote is lost temporarily by a change of address. Some states sanction absentee voting by mail or by permitting a vote to be recorded in a district other than that where the voter resides. On the Mexican and in the World War facilities were provided for American troops to vote in the elections of 1916 and 1917. Residents in Washington, D. C., or the District of Columbia have no vote.

Registration is a preliminary to the exercise of the voting privilege. Nearly all the states require that citizens eligible to vote be officially listed in advance of each election. Arkansas and Texas, however, do not require registration. Other states call for registration according to the population status of communities, or whether they be in the first, second, third or fourth class cities. Where registration is essential the citizen must either appear in person and enroll, specially in the larger cities. In some cases the state laws require personal identification. In some states, again, a voter is registering declares his party affiliation, if any.

In the South, legal devices to restrict the exercise of negro suffrage, despite the full citizenship rights conferred on the colored population by the Constitution, have operated to keep that section dominated by the white vote. Several of the Southern States passed so-called 'grandfather' laws to nullify the Fifteenth Amendment. Such laws sought to confine the right to vote only to those persons whose ancestors were voters in a certain year—in one state, 1866; in another 1869—and to naturalized persons and their descendants. The grandfather's clause was not upheld by the Supreme Court where it has been appealed.

ELECTIONS, POLITICAL, CORRUPTION IN. See CORRUPT PRACTICES.

ELECTIVE COURSES are studies that can be optionally undertaken by the students of colleges and secondary schools. Formerly there was a required curriculum to which college students must adhere in order to obtain degrees. The wide extension of the modern curriculum, however, embracing as it does a range of subjects not recognized as educational under the old collegiate system, necessitated liberty of choice by the student. Optional subjects have long been an established part of the curriculum of American colleges, and of most secondary schools. Modern education has outgrown adherence to a fixed curriculum. Students are not obligated to master the classical languages to the neglect of other subjects, such as science and technology, that may be invaluable to them in their future work. This freedom in the selection of subjects is restrained in practice by the faculty, who protect the student from his inexperience and ignorance and occasional tendency to choose easy courses not requiring much mental effort.

Faculty members form combinations of subjects suitable to individual subjects and advise them generally on their studies. Elective courses have become recognized as a means of adapting education to the needs of the time. They were initiated by the University of Virginia in 1825 and were later adopted by Harvard. Cornell was founded upon elective courses, as well as Johns Hopkins and Leland Stanford Junior Universities. The newer college foundations, in fact, have, never been restricted by a rigid curriculum, while the older institutions made their courses more elastic to keep in step with the times.

ELECTORAL COLLEGE, the presidential electors named by the States to elect the President and Vice-President after the popular vote has been cast. The constitution created the Electoral College to exercise an independent choice of candidates for President and Vice-President, irrespective of the people's selection, but in practice the electors merely register, by confirmatory vote, popular sentiment. The college is really composed of forty-eight State electoral colleges whose members are chosen by popular vote of the States and whose numbers must not exceed the Congressional representation of each State. The college therefore numbers 531, equal to the combined membership of the Senate and House of Representatives. The functions of the college, for long dictated by the direct vote of the people, have become more or less formal, especially since the dispute arising from the Hayes-Tilden contest of 1876 (see ELECTORAL COMMISION). The presidential electors selected at the November polls thereafter meet in their respective States, ballot for President and Vice-President and transmit their choice to the President of the Senate, who counts the returns from the States' presidential electors in the presence of the Senate and House. Provision is made for election by Congress in case the electors' choice does not receive a majority of all the votes. In case of a tie, the House votes by States, each state having one vote, for one or other of the tied candidates for President. In the same event the Senate selects the Vice-President. Where there is no tie, but the leading candidate does not receive the required majority of all the votes cast by the Electors, the final choice of President is delegated to the House, and the Vice-President to the Senate. John Quincy Adams was elected President by the House in 1824, and in 1837 the Senate chose Richard M. Johnson for Vice-President.

ELECTORAL COMMISSION, a group of five United States Senators, five members of the House of Representatives and five Supreme Court justices, fifteen in all, appointed by President Grant in 1877 under authority of Congress to determine the successful candidate in the presidential election of 1876. The leading candidates were Samuel J. Tilden, Democrat, and Rutherford B. Hayes, Republican. The popular vote elected Tilden by a plurality of 250,935, the figures being, Tilden, 4,284,885; Hayes, 4,033,950. But the subsequent vote of the Electoral College (*q.v.*), which confirms the choice of the populace, revealed duplicate sets of electoral votes, certified by conflicting State authorities, from four states—South Carolina, Florida, Louisiana, and Oregon. There were 369 electors, and half, or 185, constituted a majority. The votes of all the State electors except the four named, gave Tilden and Hendricks (the Democratic candidate for Vice-President) 184, and Hayes and Wheeler (the Republican candidate for Vice-President), 165. Twenty votes were in doubt. The Senate was Republican; the House Democratic. There was thus a deadlock. The Democrats only needed one electoral vote to elect their candidates; the Republicans needed all the votes from the four States whose figures were in dispute. Doubtful returns could not be discarded, as formerly; so that the issue could not be settled by the undisputed votes. A critical situation arose, and to meet it the Electoral Commission was created. The Democrats were confident that the twenty votes in dispute would give them at least the one vote they needed. The Commission, however, in passing on the validity of the questioned votes of Florida, Louisiana, Oregon, and South Carolina, voted eight to seven in favor of the Republicans on each contested point. The Republican candidates, Hayes and Wheeler, gained the twenty votes in dispute and were therefore elected by one vote, the Senate sustaining the Commission's decision.

ELECTORAL REFORM. Measures for safeguarding the honest conduct of elections not only control the machinery of voting contests but embrace legislative innovations that affect the functions of government itself. The past history of American elections is honeycombed with recitals of illegal voting, bribery and intimidation, the political subsidizing of 'repeaters' and 'floaters', false counting by ballot-box stuffing or by tampering with mutilating or cancelling ballot papers, and frequently by violence, riots and drunkenness. The absence generally of these evils at the present day indicates the effectiveness of the electoral reforms already established.

By the passage of corrupt practices laws the states warred on the swelling of campaign funds by contributions from sordid influences seeking sordid ends through legislative favoritism. Publicity of campaign funds provided a searchlight on individual contributions and exposed receipts and expenditures that were other than legitimate. Intimidation was stopped by the secret ballot. Padded and rifled ballot boxes and falsified counting came under the vigilance f election boards and is rarely known today. Personation and other devices of illegal voting have been curbed by preliminary registration. Congress has also checked the unscrupulous expansion of campaign funds for national elections by forbidding corporations to subscribe to funds used in electing the President and members of Congress on pain of fine, and by requiring, like the States, full publicity of election moneys, received and spent. Federal laws likewise restrain political contributions from being solicited in government buildings and forbid government employees from receiving or collecting such moneys. See CIVIL SERVICE REFORM.

In recent years a striking feature of electoral reform has been the broadening of facilities of the exercise of popular judgment by the institution of the Initiative, Referendum and the Recall (*qq. v.*) in a number of states and municipalities. The Initiative is a device for overriding indifferent state legislatures by allowing a direct vote of the people to pass certain desired legislation into law. The Referendum is the submission to the electorate for its approval of proposed measures, such as an issue of bonds, before a legislature passes upon them. The Recall enables the voters to decide whether an elective officer's continuance of his office is desirable or not, and to recall him if a majority of the votes cast is against the implicated official. Mayors have been recalled by popular vote. On the other hand, a Recall vote may turn out to be in favor of the official under fire, in which case he retains his post with a public exoneration.

The foregoing measures, in addition to the growing favor shown for the short ballot, the establishment of direct primaries, the presidential preference primary, direct election of U. S. Senators, and woman suffrage, are landmarks that show the trend of a reform in election methods aiming at an effective and untrammeled expression of the popular will and the curtailment of government by political cliques. See BALLOT REFORM.

ELECTORS, the Ger. princes (Kurfürsten), originally seven, who elected Ger. kings and Holy Rom. emperors—royal titles almost invariably held by one and the same man. The Ger. kingship, like that of other countries, was partly elective, partly official, though for several reasons the elective element came to predominate, partly because the Rom. Imperial tradition was maintained, and the old Empire had always been elective. By the XII. cent. the usual e's were the three Rhenish abp's (Köln, Mainz, and Trier) and the great dukes. Golden Bull of Charles IV. 1356 recognised as lay e's the Palatine of the Rhine, Duke of Saxony, Margrave of Brandenburg, and King of Bohemia; two other votes were cr. for Bavaria 1623 and Hanover 1708.

ELECTRA (classical myth.).—(1) One of the Pleiades. (2) *D.* of Agamemnon and Clytaemnestra, and *s.* of Orestes. Subject of tragedies by Æschylus, Sophocles, and Euripides, and opera by Strauss.

ELECTRICAL ALTERNATIVES. See ALTERNATIVES, ELECTRICAL.

ELECTRICAL SUPPLY.—For supply purposes, electricity is generated by dynamos driven by steam engines, gas engines, or water power, where the last-named is available. The current so produced is conducted along copper cables overhead or underground from the generator, which is usually situated in a large central power-station, to the point where it is to be utilzed in one or other of the chief commercial and industrial applications of electric energy, such as lighting, traction, the driving of machinery, heating, electro-chemical processes, and electric furnaces. The current generated by the dynamos may be either *alternating* (*i.e.*, changing in direction twice for each revolution of the dynamo coils) or *continuous* (*i.e.*, always flowing in one direction). For certain purposes the former is preferred, while for others the latter is better: thus, for traction a continuous current is essential, while for lighting either system may be employed. For transmission purposes over long distances the *alternating current* is by far the more suitable, owing to the extreme simplicity and high efficiency of alternate current transformers. In such cases there would be great loss of power consequent upon the heating of the long cable by the current. To reduce the current, and with it the size of the cable, recourse is had to very high pressure, as much as 220,000 volts having been used. It is practically very difficult to construct continuous-current dynamos for pressures exceeding 2,000 volts; hence for this class of work the alternating current is preferred. Two methods of transmission are employed: the current is either produced at high pressure at the central station and transmitted unchanged to the substation, there to be reduced to low pressure; or it is produced at low pressure, changed at the central station into a high-pressure current by a step-up transformer, transmitted to the substation, and there changed back to a low-pressure current by step-down transformers.

The *continuous-current* system is in general use for supplying energy in the immediate neighbourhood of the generating station or within a comparatively short distance of it. The current is generally produced at a pressure of about 220 volts, and is supplied to consumers at half this voltage by means of the well known 'three-wire'system, in which the middle wire is grounded at both ends. It is customary to use storage batteries on these circuits. The function of these batteries is to help when the load is heaviest, to act as a stand-by in the event of a breakdown in the machinery, and occasionally to take up the whole duty of the station at those hours when the load is small, thus permitting the engines, with their attendant staff, to cease work. The cost of such a battery is high and its upkeep troublesome and expensive, but its uses are so many and so valuable that it is very rarely dispensed with. For small, private installations the use of gas, gasoline or Diesel engines for driving the generators has been found to give very good results, and being a convenient and simple arrangement is coming into general use.

ELECTRIC BLOWERS. See Blowers, Electric.

ELECTRIC BRAKES. See Brakes.

ELECTRIC CARS. See Automobile.

ELECTRIC CHAIR, a modern device employed for the execution of criminals. It consists of a large armchair, to which are attached two electrodes. On being seated in the chair the criminal is strapped down around the arms, chest and legs, and one electrode, wetted with salt water, or water in which alkali has been diluted, is applied to the back of his head and the other to the calf of one of his legs, after which an electric current of 1,600 volts is sent through the mechanism, supposed to cause instant death. The contact lasts about a minute. The electric chair was first adopted as the official means of execution by New York, in 1888, according to the recommendations of a special commission appointed to study it. An attempt was later made to have it declared unconstitutional as a 'cruel and unusual punishment,' but without success. Since then electrocution has been adopted by New Jersey, Pennsylvania, Massachusetts, Indiana, Nebraska, Kentucky, North and South Carolina, Virginia and Arkansas. It was also adopted by Ohio,

ELECTRIC CLOCKS. There are three distinct types of electric clocks, as follows: (1) Clocks in which the minute hand is advanced one minute, every minute, by a train of gears connected to a ratchet and pawl actuated by an electro-magnet. A high grade master clock of the pendulum type, conveniently located, has a contact-making attachment which it operates once a minute, sending out an electrical impulse through the wires to the secondary clocks. This impulse, by means of the mechanism described above advances the hand of the secondary clock. (2) Clocks run by the usual train of gears, escapement wheel or pendulum, and spring; but which are synchronized with the master clock once every hour, by means of an electro-magnetic device in the clock, actuated by impulses sent out over wires by the master clock. The springs of these clocks are periodically wound by a small electric motor. (3) Clocks operated by a small synchronous motor, geared to the hands. This motor is connected to the Alternating Current lighting system, the frequency of which is kept absolutely uniform by delicate governors on the generator prime movers at the power house. These governors are continually supervised by a master clock. The secondary clock therefore is always in synchronism with the master clock.

ELECTRIC CONDUCTION. See Conduction, Electric.

ELECTRIC EEL (*Gymnotus electricus*) most formidable of electric fishes, capable, by electric shock, of overturning horses; found in rivers of Brazil and Guiana, 6 to 8 ft. long; not related to true eels.

ELECTRIC FURNACES are of three general types:

1—*Arc Furnaces*, in which the heat is generated by an electric arc, struck between (a) one electrode and another; (b) an electrode and the body of the furnace; or (c) between the electrode and the charge in the furnace. The electrodes are often made of carbon owing to its heat resisting properties together with its comparatively low resistance and the fact that the products of the arc will be gaseous $C O_2$ Carborundum has also been used for electrodes. In some arc furnaces, the arc is deflected by powerful magnets so that it plays against the charge. The temperature attainable in these furnaces is as high as 6300° F.

2—*Resistance Furnaces* in which heat is generated by the passage of an electric current through a resistance element. The latter may be (a) imbedded or incorporated in the furnace walls, the charge deriving its heat by radiation and conduction, (b) imbedded in the charge, which is then heated by conduction or (c) the charge itself. In work requiring low temperatures, resistance elements of metal may be used: however if the desired temperature is higher than the melting point of metals, carbon or carborundum are employed. This type of furnace is used where high temperatures are required e.g. the preparation of carborundum at 6300° F.

3—*Induction Furnaces* in which the heat is produced by an electric current induced in a portion or all of the molten charge. The furnace is really a transformer, with the large coil external to the furnace proper, acting as the primary, and the molten charge acting as a low resistance short circuited secondary. The electrical energy supplied to the external coil is converted into an alternating magnetic field, in which lies the molten charge (which must be an electrical conductor). This magnetic field, being alternating, induces current in the conducting charge. These, circulating through the molten metal, expend their energy in generating heat. Temperatures up to that at which the metallic charge volatilizes are possible with this type of furnace.

ELECTRIC HEATERS are appliances for converting electrical energy into heat. This conversion depends on the fact that when an electric current flows through a conductor, heat is generated in an amount proportional to the product of the currents trength and the resistance of the conductor. There are two types of heaters, the radiant and the convection. The radiant heater depends upon radiation from the heating elements (maintained at approximately 1200° F.) to raise the temperature of the surroundings. The heating elements in this case are either large glow lamps with heavy filaments, or coils of resistance wire supported on refractory insulating supports. A highly polished reflector is used to reflect and concentrate the heat rays into a 'zone of action'. The heat generated, being radiant, only raises the temperature of a body opaque to the rays; it passes through the air without heating it, effecting a rise of temperature of the air only by heating opaque objects, which in turn heat the air by conduction. This type of radiator is not well suited for general room heating, but is convenient for quickly warming a portion of the body.

The convection heater consists of a resistance element in the form of a spiral spring, grid or flat strip of high resistance conductor, which is heated when current flows through it. Operated at a much lower temperature than the radiant heated, it is so constructed that air circulates through the heating elements. Heated by contact with them, it rises, thus creating convection currents in the room. This type, well suited for ordinary heating service, is much used to heat electric cars, street railway waiting rooms, etc. Notwithstanding the fact that electric heaters are 100% efficient, *i.e.* all the power consumed appears as heat, their use on a large scale is not commercially practicable. Thus, the cost of heating a house by electricity has been computed to be 200 times as great as by coal. This figure includes neither labor nor repairs. This disadvantage of these heaters is offset by their cleanliness, convenience and the fact that they do not vitiate the air.

ELECTRIC LIGHT, artificial illumination produced by an electric current passing through filaments of suitable material, usually carbon or platinum. Its discovery was due to the experiments of the English scientist Humphrey Davy, who in 1800 found that if two pieces of carbon were joined by conductors to an electric current, brought together and then slightly separated, a flame was emitted that grew steadily brighter as the points became hotter. That discovery was the basis of the whole modern system of electric lighting. It has been made a practicable system by the improvement of the material used for the filaments, the employment of mechanisms to keep the electrodes at a constant distance, as well as to give them the initial contact to start the arc, and the use of the vacuum tube as a container. Davy used charcoal points, which formed excellent electrodes but burned out too quickly. The basic material for the carbons now used, that have been developed by incessant experiment, is lamp black, gas coke or refined petroleum coke, mixed into a stiff paste which is then dried, shaped, cut, and forms a hard and uniform carbon. An advance was made when the open arc was superseded by the enclosed arc, a globe that modifies the character of the light and lengthens the life of the carbons. Then came the flame lamps where oxides were introduced into the carbons to increase the luminosity. The greatest advance of all however was recorded when Edison invented the carbon incandescent electric lamp now in almost universal use. This consists of a carbon filament attached to two platinum wires, a glass bulb in which a vacuum is created and a threaded base attached to the bulb. The vacuum tube lessens the heat and retards the disintegration of the filament, since there is no oxygen to combine with the carbon and cause combustion.

ELECTRIC MACHINE, used largely as a therapeutic agent in exciting an electric current, either by friction or by static induction. The first type is based on the principle that glass or sealing wax, when subjected to friction, produces an electric flow. There are many varieties of this type, but in its simplest form it consists of a glass cylinder being turned rapidly, usually by hand. What is called a 'rubber,' a cushion of leather filled with horsehair, attached to a movable frame, is pressed up against the revolving glass, a silk flap attached to the 'rubber' being thrown half over the cylinder. The flow of electricity generated passes through the metal frame to which the cushion is attached. The second type of electric machine is based on the old electrophorus. A cake of amber or vulcanite, from 12 to 15 inches in diameter and about an inch thick, rests on an iron plate. A metal disc, with an insulated handle, somewhat smaller in diameter than the vulcanite plate, is laid on top of the latter after it has been rubbed with dry flannel. Since the vulcanite is a non-conductor, the negative electricity generated by the rubbing passes out of it only at the points of contact with the metal disc, which is at not more than three or four points. Enough current may thus be generated to charge a Leyden jar.

ELECTRIC POWER TRANSMISSION OF. Strictly speaking, any transmission of electric current, regardless of what it is to be used for should be included under this head; but the conventional meaning of the term is limited to the transmission of current from a relatively distant point, where the power is generated, to the point where the power is distributed to the various users. There are two classes of electric power transmission, namely short distance, where direct or alternating current is applicable; and long distance transmission where the use of high voltage and alternating current predominates. Owing to the fact that in many systems the use of voltage transforming devices is not economical, the voltage in short distance work in general does not exceed 500 V. D. C. or 2300 V. A. C. This relatively low limit is necessary since full transmission voltage must be applied to motors, and the use of high (over 2300 V.) voltage machines is not good practive around industrial plants. Both A.C. and D.C. systems have their advantages, and a careful study of conditions must be made before a system is chosen. Long distance transmission dictates high voltages to reduce both the power loss in the line, and the amount of copper required to transmit a given quantity of power. Voltages as high as 220,000 are now being used. The transmission voltage is limited only by the insulators obtainable, the loss due to 'corona' discharges and the insulation of the transformers available. Where voltages higher than 13,000 volts are used, it is usual to operate the generators at this low voltage transformers being employed to obtain transmission voltage. The question of frequency of power systems has been much discussed. 25,40,133 and 60 cycles per second have been used; present practice, however has standardized on 60 cycles (although the other frequencies may be found to a limited extent). A.C. transmission usually employs the three wire, three phase system owing to its great economy of copper.

ELECTRIC PRIMARY BATTERY. See BATTERY, ELECTRIC PRIMARY.

ELECTRIC UNIT. See AMPERE.

ELECTRICITY. ELECTRIC CURRENT.—If a plate of copper and one of zinc be dipped into dilute sulphuric acid, a difference of electric potential is set up between them, the part of the zinc plate in the liquid being at a higher potential than the corresponding part of the copper plate.

Now it has been found by experiment that electricity flows round a closed circuit from a point at higher potential to one at lower potential, just as water flows from a point at higher level to a point at lower level, or heat passes from a body at higher temp. to one at lower temp. If, therefore, the electric circuit be completed by joining the part of the copper plate outside the liquid to the corresponding part of the zinc plate by a wire or other metallic conductor, a current of electricity will flow round the circuit from the zinc plate to the copper plate within the liquid, and from copper to zinc outside. This current will continue to flow as long as the difference of potential is maintained and the circuit remains unbroken. The whole arrangement is in fact a simple voltaic cell. In practice, more elaborate cells, arranged either individually or grouped into batteries, and dynamos are used to produce currents; but however the methods employed may vary, the generation of the current depends in every case on the production of a difference of electric potential.

Substances which allow the current to pass freely along them are called *conductors*; those which offer high resistance to the current are known as insulators. All the metals conduct well; glass, porcelain, ebonite, etc., are good insulators. The presence of the current cannot be detected by the senses. Its existence is deducted from certain properties acquired by the conducting wire: it becomes heated, a magnetic field is produced around it, and if it is severed and its ends dipped into solutions of chemical salts these latter are decomposed.

Practical Units.—The practical unit of current is the *ampere*; the unit difference of potential or electric pressure, the *volt*. Every conductor resists the passage of the current to some extent, and the unit of resistance is the *ohm*. The relation between current C, pressure, voltage or electromotive force E, and resistance R in a circuit or conductor is given by Ohm's Law, E = CR. If any two of these quantities are known the third is determined. Thus, if a cable is to carry 300 amperes and the potential difference between its ends is 6 volts, its resistance must be 6—300 = ·02 ohms.

Resistances in Series and in Parallel.—When conductors are joined in series (*i.e.*, end to end) their joint resistance equals the sum of their separate resistances. When they are in parallel (*i e.*, branch out from one point and join together at another) the current divides itself among them, the smallest resistance carrying the greatest current, and the amount of current in each branch being inversely proportional to the resistance of the branch. Any number of resistances (r_1, r_2, r_2, . . .) in parellel are equivalent to one resistance R. the magnitude of which may be determined from the formula $\frac{1}{R} = \frac{1}{r_1} + \frac{1}{r_2} + \frac{1}{r_3} +$ In the special case of n equal resistances in parallel, each — r, each branch carries $\frac{1}{n}$ of the current and the total resistance $R — \frac{r}{n}$

ELECTRICITY, ANIMAL. Electrical changes are believed to be associated with most vital processes, and are known to occur in the animal body in connection with muscular contraction and glandular activity. In these cases, however, the electrical phenomena involved are trivial, but in a number of so-called electric fish the electromotive force generated is sufficient to cause a severe shock when the animal is touched. The *Electric Ray* (Torpedo marmorata) a large fish found in the Mediterranean, has two electric organs between the front of the head and the gills. These organs resemble, in shape, flat kidneys, and consist of thousands of transparent electric plates, separated by partitions, extending from the upper to the lower surface of the body. When the fish is alarmed, a succession of shocks passes through these plates, sufficient to kill animals coming into contact with ths fish. The *Electric Eel* (Gymnotus electricus) is found in the rivers of South America, and attains a length of eight feet. On each side of the tail is an electric organ which is capable of causing a current to pass from the tail to the head. A shock from the fish is sufficient to stun large animals. The *Electric Catfish* (Malopterurus electricus) found in African rivers, and growing about a yard in length, possesses an electrical apparatus formed of modified skin glands, existing all around the fish between the skin and muscles. The fish is capable of producing a force of 450 volts, sufficient to temporarily paralyse a man. In all cases, the current produced is not steady. The fish produce a succession of short shocks, gradually decreasing in intensity. Strychnine, which in an ordinary animal produces muscular convulsions, causes the Electric Ray to give off a rapid succession of shocks, which continue until the fish is exhausted. There are stated to be more than four dozen different species of fish capable of giving electric shocks.

ELECTRIC RAILWAYS, surface, elevated or underground railways in which the motive power is electricity. Prior to 1884, a few small roads had been built to demonstrate the feasibility of electric traction but it was not until 1888 that the Sprague Electric Railway system invented by Frank Julian Sprague, was put into operation in Richmond, Va. with such an increase in transportation facilities and such a saving in the cost of operation that it foreshadowed the end of animal traction and marked the beginning of a new era. From that time the development of electric traction systems has been rapid. First came the electric equipment of existing horse railways, then the institution of the overhead trolleys, then the electrification of railroad systems formerly operated by steam, though this has hardly progressed beyond the zones of suburban traffic. Subways use electricity exclusively for motive power, as do most elevated roads.

The genesis of the system was crude and the ingenuity of engineers has been taxed to obviate mechanical difficulties, save wear and tear and cheapen cost of operation. One of these marked improvements was the 'magnetic blow-out' devised by Elihu Thomson, the effect of which was to control the breaking of the circuits and eliminate the destructive effects of sparking due to the breaking. Another was the 'multiple-unit' system of control, by which a number of cars on a train could be equipped with electric motors and operated from any one of the cars. Another advance was registered by the Westinghouse controller, which, operating pneumatically, supplies current to the motor, the valves of the system being worked by magnets in a local circuit which derives its energy from a few storage batteries on each car and is operated by a master-controller on each car of the train. Thus all the operations are independent of the line current.

The obstacles that overhead trolley wires put in the way of firemen in the case of conflagrations has led many cities to forbid their use. This has made necessary the substitution of the conduit system now in use in New York, Washington and many other large cities. The conduit is a small tunnel for the conductor rails and the current for the car is collected by a device known as the plow, which passes through the slot and has two metal contact shoes held by springs against the conductor rail. Ducts are placed beside the tracks, and these contain the feed wires that are connected at intervals with the conducting rail.

Electric railway today spread over the country in a vast network of transportation facilities that have contributed immeasurably to the comfort and convenience of the people and have assisted in the upbuilding of outlying districts. Especially is this true of the inter-urban railways, where for long distances a speed can be attained approximating that of an express train. While in a limited sense they are a commercial competitor of the steam railroad, in a much more important sense they are complementary, and the success of the one is bound up in the prosperity of the other.

ELECTRIC TURBINE. See Turbine Engines.

ELECTRO-CHEMISTRY. That branch of the science in which chemical changes are brought about by electrical means. Strictly speaking, this includes only those processes involving electrolysis—*i.e.* the decomposition of a compound by the passage of an electric current, and the liberation of the composing elements at the two poles. Electrothermal processes, however, depending on high temperatures which are obtained by electrical means, are frequently included in the electro-chemical field. Among such processes may be mentioned the manufacture of artificial graphite, carborundum and calcium carbide, and many metallurgical processes, all of which are carried out in electric furnaces of various types. Strictly electrochemical processes depend upon the fact that when a direct current passes through a solution of a compound, or through the compound itself in a fused condition, the compound is split up into its composing elements, the metallic radicle being liberated at the kathode (or negative pole) and the acid radicle at the anode (or positive pole). Before such decomposition can occur it is necessary that the voltage should reach what is known as the 'decomposition voltage' this figure varying with different compounds. Moreover, the amount of metal deposited at the kathode is proportional to the current and also varies with different metals. The number of grams of metal deposited per second by a current of one ampere is known as the 'electro-chemical equivalent' of the metal. The value for silver is 0.00111827 and the corresponding value for any other metal may be found by multiplying the above figure by the chemical equivalent of the metal and dividing by 107·88. In other words, the electrochemical equivalents are proportional to the chemical equivalents.

Important electro-chemical industries include metallic plating, the refining of various metals and the manufacture of sodium, potassium, chlorine and caustic soda. Copper is refined by the electrolysis of a solution of copper sulphate, and a similar solution is used for copper plating. In the case of silver a solution of the nitrate is used, while gold is refined and plated from a chloride solution. Zinc is deposited from zinc sulphate solutions, and galvanizing of iron is carried out electrolytically from solutions of the sulphate, chloride or cyanide. Other metals, either recovered or refined by electrolysis, include lead, cadmium, antimony, nickel, bismuth and tin. The manufacture of chlorine and caustic soda is a typical electro-chemical process. A solution of brine is used as the electrolyte, and a current of high amperage and low voltage is passed through it, splitting it up into chlorine, which is evolved at the anode and sodium which is deposited at the kathode. Since sodium combines readily with water, the metal is not recovered as such, but immediately forms the hydroxide (caustic soda). In order to prevent shemical reaction between the chlorine and the soda, which would result in the formation of hypochlorites, the anodes are separated from the kathodes by a porous diaphragm, which permits the passage of the electric current and of the electrolyte, but prevents the passage of the products of electrolysis. The anodes are usually made of graphite or other form of hard carbon, and the kathodes of sheet steel or iron. The diaphragms are made of asbestos or a mixture of asbestos and cement. In the manufacture of sodium, an electrolyte of fused sodium hydroxide or sodium chloride is used in place of the solution.

ELECTROCUTION, term used for the execution of a criminal by electricity, a method employed in America, first in the State of New York in 1890. The criminal is seated in a special chair, his body, arms, and legs secured by straps; one electrode is fastened to his head, and another to one leg, and a current of electricity passed through the body several times for a few seconds at a time, at varying strengths. The first application, at 1600-1800 volts, destroys consciousness and stops the circulation and respirations at once, and the subsequent applications prevent any possiblity of the recovery of these functions. Death is painless, and the process less revolting than hanging or beheading by the guillotine.

ELECTRO-DEPOSITION (*Electro-Plating and Electrotyping*).—The principles of electrolysis are employed in the deposition of metals in a pure form on prepared surfaces. The article to be plated is attached to the negative pole of a battery and immersed in a bath containing a solution of some salt of the metal to be deposited. It thus becomes in effect the kathode of an electrolytic cell. The anode is made of the metal of which a coating is desired. As the current passes, the metal is deposited on the article in the bath, while the anode gradually dissolves, thus maintaining the solution at approximately constant strength. A bath of silver nitrate solution and a silver anode will give a deposit of silver; a bath of copper sulphate and a copper anode will give a plating of copper, and so on. Suitable metals for deposition in this way are silver, copper, nickel, and gold; unsuitable are sodium and potassium, which dissolve in the liquid. To secure a regular and adherent deposit the concentration of the solution must be carefully regulated and the current strength kept within suitable limits.

Silver.—To prepare a solution for deposition of silver, dissolve 2 oz. fine grain silver in nitric acid (equal volumes of strong acid and distilled water), evaporate to dryness, redissolve in distilled water, add potassium cyanide till the whole of the silver is precipitated as silver cyanide, filter, wash the precipitate with tap water, dissolve in cyanide solution, and make the whole up to one gallon. With this solution the current from one bunsen cell will give a good deposit on brass, copper, and Ger. silver. Pewter, lead, zinc, and iron should be first coated with copper (see below) and then treated as above.

Copper.—For depositing copper a solution of copper sulphate containing 2 lb. of copper sulphate crystals to one gallon of water gives satisfactory results. The conducting power of the solution is improved by the addition of half a pint sulphuric acid. Lead-lined wooden vats are commonly employed to hold the solution, but slate, stone, and glass are also used. On electro-positive metals deposition takes place on simple immersion in the acid copper sulphate solution; but to obtain a regular deposit on brass, and on those metals and alloys on which deposition does not take place on immersion, and for electrotyping on wax and compositions, the electric current is required. A single bunsen cell gives sufficient voltage, and more cells may be added in parallel as required to secure a current density of 10 to 15 amperes per sq. foot. For coppering directly on to such positive metals as iron, pewter, zinc, or tin, alkaline solutions only are available. A good solution may be prepared by adding strong ammonia solution instead of sulphuric acid to the solution of copper sulphate given above. Two bunsen cells in series—more in parallel as required—are needed with this solution.

Nickel.—Nickel is deposited from a solution in which 12 oz. nickel ammonium sulphate are dissolved in one gallon of water, and the solution neutralized with a few drops of ammonia. To commence deposition a potential difference of 5 or 6 volts (three or four bunsen cells in series) is used till a thin film is obtained. The voltage is then reduced to 2 to 3 volts, and the current density is kept at 3 to 4½ amperes per sq. foot from three to five hours.

Gold.—Being strongly electro-negative, gold may be readily deposited from solution by simple immersion; and much gilding is done that way. But the de posit so obtained is very thin. To deposit by means of the current a solution is prepared as for silver (see above), except that aqua regia (three parts hydrochloric to one part nitric acid) is used instead of nitric acid. The current in this case must be of only moderate density, and the solutions are generally used at a temp. of about 135° F.

The process of *electrotyping* also depends on electro-deposition. It is a long and elaborate process, too intricate for detailed description. Briefly, it may be said, the type, after being set up and corrected, is locked up in a strong iron frame, and carefully cleaned, dried, and blackleaded. The hot wax composition in which the impression is to be taken is poured into a shallow tray, (allowed to cool, and also well blackleaded. The prepared 'forme' is then placed face downwards upon the prepared wax, and pressure is applied. When the pressure is released the forme is raised, and the wax mould is again blackleaded to make its surface conductive. The mould is then attached to a wire from a battery and deposited in a bath of copper sulphate solution similar to that described above. Here it acts as the kathode, and deposition of copper upon it is allowed to take place till the deposit reaches a thickness of $^1/_{100}$ in. to $^1/_{32}$ in. A high current density of 30 to 40 amperes per sq. foot is used; and if the liquid be slowly agitated the density may be raised to 100 amperes or more. The mould is finally removed from the bath, cleaned of wax, and finished by 'backing,' planing, bevelling at the edges, and mounting on wood.

ELECTRODES. The terminals by which electricity enters or leaves a solution or other conducting medium. The positive electrode which is the one by which the current enters the medium, is known as the *anode*, while the negative electrode is known as the *kathode* (sometimes spelt *cathode*). In the process of electroplating, the article to be plated forms the kathode of the cell. For instance, a spoon to be plated with silver will be placed in a cell containing a solution of silver nitrate. One, or more, bars of silver are also placed in the solution and these bars and the spoon are connected to a battery in such a way that the current enters through the bars and leaves through the spoon. The bars thus become the anodes of the cell, while the spoon is the kathode. Within the cell, the current travels from the anode to the cathode, the solution of silver nitrate is split up and a layer of silver is deposited on the spoon. Electrodes are made of various materials according to the uses to which they are put. Anodes are commonly made of graphite, lead, iron alloys or platinum. Cathodes are commonly of metal, especially those used in refining, which are usually of the same material as the metal being deposited.

ELECTRO-DIAGNOSIS. Electrical devices are finding ever more extensive and varied application in the diagnosis of disease. In diagnosing various conditions, especially of the nasal passages, larynx, and the urinary bladder, small electric lamps attached to instruments suitable for the exploration of such parts of the body have proved of great value, while in the location of foreign bodies and of urinary calculi, in the diagnosis of fractures and diseases of bones and of other conditions, the X-rays discovered by Rontgen have created a revolution, and examination with them is becoming more and more a routine in surgical diagnosis.

In the diagnosis of conditions due to nervous degenerations two forms of electricity are employed: the galvanic or continuous current, and the faradic or interrupted current, the former stimulating the muscles directly, and the latter the nerves directly and the muscles only through their nerve supply, the diagnosis depending on the excitability of the muscles.

Claims have recently been advanced that all pathological conditions can be accurately diagnosed, and in early stages cured, by an electric machine devised by Abramson of San Francisco.

ELECTRO-KINETICS treats of the properties and manifestations of the electric current. These may be grouped under four heads:

(1) *The Production of a Magnetic Field around the Conductor* (*Electromagnetism*).—Owing to this property the mechanical action of one current-carrying conductor on another is such that parallel conductors attract each other if the current flow in the same direction in both, and repel each other if the current flow in opposite directions. This principle has been applied practically in such instruments as Weber's electrodynamometer and Kelvin's ampere balance.

(2) *The Production of Heat.*—Even the best conductors, such as silver and copper, offer some resistance to the passage of the current. Work must be done in overcoming this resistance, and the performance of this work results in the production of heat. The quanitty of heat evolved in 2 seconds by a current of C amperes working through a resistance R is by Joule's Law ·24 Ci-Rt calories. Manifestly the greater the resistance the greater will be the amount of heat devel-

oped. Thin conductors offer greater resistance than thick ones, hence in a thin filament like that of an incandescent lamp the resistance is so great as to raise the filament to the white heat of incandescence. Similarly the high resistance of the carbon vapor between the electrodes when an electric arc is struck between them causes the intense heat of this phenomenon, so extensively used commercially both in lighting and in the metallurgical processes that depend upon the electric furnace (electro-metallurgy).

(3) *Chemical Effects* (*Electrolysis*).—When the current is passed through solutions of metallic salts (*e.g.*, copper sulphate, silver nitrate, etc.) the metal is liberated from the solution and may be deposited on suitable surfaces. This fact is the basis of all the varied processes of electroplating and electrotyping. It is also utilized to furnish the present legal definition of the practical unit of current (the ampere), which is defined as 'that current which deposits .001118 grammes of silver per second.'

(4) *Induction.*—Faraday discovered that if a conductor be moved so as to cut the lines of force of a magnetic field, or if a magnetic field be moved so that its lines of force are cut by a conductor, a current of electricity is generated or induced in the conductor, and the strength of the induced current is directly proportional to the rate at which the lines of force are cut. This discovery made possible the production and use of the electric current on the commercial scale by means of dynamo-electric machinery. Essentially every dynamo consists of a number of coils of wire revolving in a strong magnetic field in such a way as to cut the lines of force of the field. Induced currents are thereby set up in them, and these are conducted to external circuits and supply light, heat, or power.

ELECTROLYSIS. If platinum plates attached to wires from a battery of two or more voltaic cells be dipped into pure water or pure hydrochloric acid, no change takes place in the liquid, and no current passes; but if a little of the acid be added to the water, the liquid becomes a conductor, and allows the current to traverse it, while it also undergoes chemical decomposition in the process. Substances which in aqueous solution conduct electricity are termed *electrolytes*; they include salts, acids, and bases. Dissolved in chloroform, the same substances do not conduct electricity the reason being that they are present in a special condition in water. This condition is known as dissociation. It is supposed that in an electrolytic solution some or all of the molecules of the dissolved substance are broken up into their constituent atoms or radicles which are oppositely charged; such charged atoms or radicles are called *ions*, and the phenomenon is termed *ionization*. The metallic atom or *cation* carries positive electricity; the acid or salt radicle is the *anion*, and carries negative electricity.

In the case of an aqueous solution of sodium chloride there are sodium ions and chlorine ions present. These being modified by the charges they carry, do not exhibit in the solution the properties of the elements sodium and chlorine. When a current is passed through the solution, the electric forces direct the anions or chlorine ions to the positive pole or *anode* of the electrolytic cell, and the cations or sodium ions to the cathode or negative pole. At the anode the negative charge of the anion is neutralized, and the ion becomes an ordinary atom, and is liberated as chlorine gas. Similarly at the cathode, the positive charge on the cation is neutralized and the ion liberated as metallic sodium. This sodium at once attacks the water, forming sodium hydroxide in solution and liberating hydrogen, which bubbles off at the cathode. The whole process is known as electrolysis, and the electrolytic cell is called a *voltameter*. In the electrolysis of copper sulphate copper electrodes are employed, and the copper ion, when liberated, is deposited on the cathode. Electrolysis forms the basis of many industrial processes for the isolation and refining of metals, and is also used in electroplating and electrotyping.

ELECTRO-MAGNETIC WAVES.—When a charged condenser is discharged through a bad conductor, the opposite charges slowly neutralize each other; but if a good conductor be employed, the charges flow towards each other so rapidly that in part they overshoot the mark and recharge the plates with decreased charges of reversed sign. These charges surge back again, and the operation may be repeated several times with gradually diminishing energy before the charges come to rest. If the discharge be made through a good conductor with a short air gap, the first portion of the discharge sets up a conducting path for the surgings that follow. The amplitude of oscillation becomes rapidly less, but the frequency of oscillation remains constant during the whole discharge, which is practically instantaneous. The time of a complete oscillation is 2—+—LC where L is the self-induction of the circuit and C its capacity.

When the electric oscillations are

extremely rapid the phenomena are not confined to the circuit, but the surrounding medium is traversed by a series of electro-magnetic waves, which travel outwards from the apparatus with the velocity of light, and the frequency of these waves is equal to that of the oscillations within the circuit. It has been shown experimentally by Hertz that these waves are capable of reflection, refraction, polarization, and interference in exactly the same way as waves of light, and that they are governed by the same laws. The view is nor held that light waves are simply electro-magnetic waves of very short wave length and high frequency, and that radiant heat is propagated by similar waves of slightly longer length than light waves.

The most important commercial applications of electro-magnetic waves have been made in connection with the development of wireless telegraphy and telephony. In Marconi's earliest apparatus the oscillations took place along the aerial, and a 'coherer' was employed as detector. In modern wireless practice the electro-magnetic waves are produced by means of vacuum tubes which produce high frequency oscillations in the aerial circuit. The waves are also detected by means of vacuum tubes of various kinds as well as by 'crystals' of various varieties. See DETECTORS, WIRELESS.

ELECTRO-MAGNETISM is that branch of the science of electricity which deals with the relation between electriity and magnetism. Oersted 1820, followed by Ampere, who first investigated the subject fully, found that when a wire carrying a current is stretched over a compass needle and parallel to it, the needle is deflected from the magnetic meridian. A magnetic field is in fact set up round every current-carrying wire. This law has since been utilized in the construction of *detectors* for locating currents and *galvanometers* for measuring their strength. To determine the direction of the field Ampere enunciated the following rule: Suppose a man to be swimming with the current along the wire with his face towards the needle: the N. pole of the needle will be deflected towards his left hand. If the electric conductor be in the form of a flat circular coil of radius r and having n turns in the coil, the strength of the magnetic field at the center of the coil due to a current C is $\frac{2\,nC}{r}$. Hence is obtained the definition of the electromagnetic or centimeter-gramme-second (C.G.S.) unit of current—viz., 'That current which, when passed through a wire 1 cm. long bent into an arc of 1 cm. radius, exerts a force of one dyne on a unit magnet pole placed at the centre of the circle.' This unit of current is too large for practical purposes; the practical unit is the ampere, which is equal to — C.G.S. unit.

When a coil consisting of one turn of wire is placed in the magnetic meridian and a current is sent round it, a short magnetic needle suspended at the centre of the coil will be deflected, and the tangent of the angle of deflection will be proportional to the strength of the current. Such an apparatus is a *tangent galvanometer*. Every such coil acts as a magnetic shell when carrying a current, one face of the shell being a N. and the other face a S. magnetic pole. A large number of such coils, wound side by side so as to form a long hollow cylinder or helix, act as a magnet while the current is passing. If a piece of soft iron be placed inside the helix as a core, the iron becomes strongly magnetic, but loses its magnetism almost entirely as soon as the current stops. Similarly, a current-carrying coil wound about a piece of iron shaped like a horse-shoe will make the latter into a strong horseshoe magnet. Such magnets are called electro-magnets. They are greatly used in electric appliances, and in particular are essential parts of modern dynamo-electric machinery.

ELECTRO-METALLURGY is that branch of Electro-Chemistry which deals with the practical production, refining and working of metals. Many of the metallurgical processes can be carried out only by the use of electricity. Among these are the manufacture of Calcium Carbide, Aluminum, Sodium hydroxide, metallic sodium, potassium chlorate, and the refining of Copper. The last is the largest and most important of the electro-chemical industries. *Iron and steel* may be produced electrically by passing a current through Magnetite (a naturally occurring magnetic oxide of iron, Fe_3O_4) and carbon, thereby heating the mixture. The Oxygen unites with the carbon and is given off as carbon dioxide. The residue is pure (wrought) iron, cast iron or steel, depending on the proportion of carbon used. It is questionable whether this process can compete with the Blast Furnace and Bessemer Converter in economy; its advantage lies in its simplicity and the fact that the fuel contains no impurities to contaminate the product. *Calcium Carbide* is produced electro-thermally by the treatment of burnt lime and coke in an arc type of furnace. *Aluminum* is prepared by the electroylsis of its oxide (Al_2O_3) dissolved in molten Cryolite ($3NaF, AlF_3$). The oxygen unites with the carbon anodes, while the liberated metal falls to the bottom of the cell, whose carbon lining forms the cathode. The electrolytic refining of *Copper* consists of transferring the metal by the action of an electric current, from an anode of the crude metal to a cathode of the refined metal, using as electrolyte, a mixture of Copper Sulphate and Sulphuric acid. The impurities which contaminate the anode either dissolve in the electrolyte, or, remaining undissolved, eventually fall to the bottom of the tank. Copper refined in this manner is 96-98% pure. *Silver* is similarly refined, using an electrolyte of dilutenitric acid.

ELECTROMETER, an electrical instrument for measuring differences of potential, by means of statical charges and not by currents. The form of instrument most frequently met with is the quadrant electrometer. In Lord Kelvin's instrument of this type, a thin aluminum needle, dumb-bell in shape, is symmetrically suspended by one or two fibres within four flat hollow metal quadrants in such a way that its centre coincides with the centre of the quadrants. The opposite pairs of quadrants are connected by wires, and a charge is imparted to the needle, which is kept at constant potential by being connected with the inner coating of a Leyden jar arrangement in the base of the instrument. If the quadrant pairs are now charged to different potentials, the needle is attracted by one pair and repelled by the other pair, and thus the fibre is twisted by an amount proportional of the square of the potential difference. A small reflecting mirror attached to the fibre registers the amount of deflection on a scale in the usual manner. A very much simpler and more sensitive form of quadrant electrometer is the Dolezalek type. In this instrument the needle is very light, being of silvered paper, and the suspension is made by means of a fine quartz or metal fibre. For measuring small potential differences the needle is independently charged to a high potential. For large potential differences or rapidly alternating potentials the needle is attached to one pair of quadrants.

High voltage voltmeters (electro-static voltmeters), utilizing this principle are now in use.

Instruments called electro-static ground detectors working on the same principle are used to determine the condition of the insulation of high voltage transmisson lines.

ELECTROMOTIVE FORCE. The force which causes an electric current to flow from one point in a circuit to another is known as the electromotive force, and is commonly abbreviated to E.M.F. It is due to a difference of potential at the two points, or in other words a difference in charged condition which causes a flow of electricity from a positive charge to a negative. The force is measured in *volts*. a volt being the force, or pressure, required to cause a passage of one ampere through a resistance of one ohm. The E.M.F. of a dry cell, such as is used for electric bells, is about 1·7 volts. An electric lighting circuit commonly has a voltage of 110 volts.

ELECTRONIC THEORY OF ELECTRIFICATION. Until late in the 19th cent. the phenomena of electrification were explained in accordance with the two-fluid theory of du Fay or the one-fluid theory of Franklin. According to both these theories, electricity is a weightless, indestructible fluid. But more modern research has finally exploded both these hypotheses. Recent investigation of the electric discharge through rarefied gases has proved that particles far smaller than the smallest atom exist, and always in association with a certain definite charge of negative electricity. These particles J. J. Thomson named *corpuscles*. But exactly the same charge is always associated with a single hydrogen atom in electrolytic processs (electrolysis); this charge has been regarded as the natural unit of electricity and called the *electron*. There is good ground for believing that the electron and the corpuscle are identical, and that the electron is in fact an 'atom of negative electricity,' and independent of gross matter. Under suitable conditions negative electrons may be freely expelled from matter by electrical forces, and they are found to travel through vacua with a speed comparable to that of light. It has been calculated that the mass of the electron is about —— of the mass of the hydrogen atom, and that its diameter is approximately ———— of that of the atom of matter.

From these facts it is evident that conskderable advances have been made in our knowledge of the nature of negative electricity, but the same cannot be said of positive electricity. The negative electron has been isolated, but not the positive electron. Hitherto the latter has always been found associated with an atom of matter, and diligent research has so far failed to gain much definite and exact information regarding it, as distinguished from the atom with which it is associated. It may be that in it lies the key to many of the most preplexing problems regarding the ultimate constitution of matter that still remain unsolved by science.

Meantime, all electrical phenomena are ascribed to the movement of negative electrons. A positively charged body has lost some of its electrons; a negatively charged body has an excess. A continuous current in a conductor is caused by the electrons being induced by the electrical pressure to travel on the whole in the direction of the electromotive force. The positively charged atoms, however, are not free to move except through small distances from their mean position, their oscillations generating heat, and hence the electrons move relatively to the atoms. This motion constitutes the current. The conductivity of a conductor is proportional to the number of electrons in unit volume of the substance; good conductors have more electrons than bad conductors. Good conductors of heat are in general good conductors of electricity. This is in agreement with the electronic theory, according to which the ratio of the thermal to the electric conductivity should be the same for all pure metals. Experiment shows this is the case, at least for all the better conducting metals.

Under normal conditions gases do not conduct electricity. Conductivity may be imparted temporarily to a gas by the following methods: (1) exposure to cathode, Lenard, or X rays; (2) exposure to radiations from radium or uranium; (3) contact with flames or hot metals; (4) passage of an electric discharge. This temporary conductivity is due to the presence in the gas of oppositely charged particles called ions, and its disappearance is caused by the re-combination of these. The negative ions are electrons, and there is evidence to support the view that the positive ions are positive electrons associated with an atom of matter.

The mechanism of conduction in liquids is explained in Electrolysis.

ELECTRONS. Units of negative electricity. Their nature is unknown although there has been much speculation concerning them. A description of them recently put forward is that they are 'rings of negative electricity rotating about their axes at high speed.' They are the ultimate particles of matter which is now considered to be built up of atoms consisting of electrons revolving about a nucleus of positive electricity. They are liberated from radio-active substances and also in the so-called Crookes tube—a tube having a high vacuum through which a high current of electricity is passed. The sun constantly pours into space vast streams of electrons, some of which reach the earth and cause various electrical phenomena. They are known to be of an electrical nature because they are attracted or repelled by the pole of a magnet. They travel, under favorable conditions, at a speed approximating that of light, or almost 186,000 miles per second. See also BETA RAYS.

ELECTROPHORUS, the simplest form of electrical induction machine; invented by Volta; consists of circular cake of resin or ebonite and a metal disk of same diameter with insulating handle.

ELECTROSCOPE, an instrument for detecting small charges of electricity. It consists of a stout wire with two gold leaves attached to one end, enclosed in a case from which it is insulated. When a charge is brought near the instrument, both leaves become charged with the same kind of electricity and repel each other. The electroscope can also be used to determine whether the charge is positive or negative. In some instruments only one leaf is used, the wire itself taking the place of the other leaf. The electroscope has recently been largely used in the study of radio-activity.

ELECTROSTATIC MACHINES are appliances for producing positive and negative electricity separately in large quantities. Of these the Wimshurst influence machine is perhaps the best known. It consists essentially of two circular glass plates placed close together and able to rotate in opposite directions. An even number of metal strips is attached to the outer surface of each plate. A small charge is given to one of the strips, the plates are set rotating, and the other strips become charged by induction from the charged strip. The charges are collected from the plates by metal combs and stored in metal knobs. Other well-known induction machines are Kelvin's water-dropping apparatus, Kelvin's replenisher, and Toepler's influence machine (also known as the Voss machine).

While these machines were used to some extent in the early practice of Electro-therapeutics, they are now rarely seen except in some school laboratories.

ELECTROSTATICS. Electrostatics treats of electricity at rest. All substances, when suitably rubbed, become electrified, and are capable of attracting light bodies. Experiment shows that there are two kinds of electrification (positive and negative) produced thus in equal quantities at the same time. Glass rubbed with silk becomes positvely electrified; sealing-wax or vulcanite rubbed with flannel or fur becomes negatively electrified. Similarly electrified bodies repel, dissimilarly electrified bodies attract, one another. Metallic substances and other conductors do not exhibit these phenomena when rubbed, unless held by a handle made of glass or other insulator. A body with a positive charge of electricity is at a higher potential than the earth; when electrically connected to earth, electricity will pass from it to the earth until the potentials are the same, which happens practically instantaneously. A negatively charged body is at a lower potential than the earth; when electrically connected, it receives electricity from the earth until the potentials are equalized. The earth's potential is taken as zero. As in electro-kinetics, electricity passes from a point at higher potential to one at lower potential, and without difference of potential there can be no electric flow.

Every electrified body tends to discharge itself to earth or to a neighbouring conductor, hence the space around it is in a state of strain and constitutes an electrostatic field. If an insulated conductor be placed in the field due to a positively charged body, it becomes negatively charged on the side next the body, and positively charged on the side remote from it. This is electrostatic induction. The transmitting medium (in this case the air) is called the *dielectric*. With glass or mica dielectrics the inductive effect is increased. These substances are said to have a higher *specific inductive capacity* (S.I.C.) than air, whose S.I.C. is taken as 1.

For purposes of *electrostatic measurement*, the unit charge of electricity is defined as that quantity which, placed at a distance of 1 centimetre in air from a similar and equal quantity, repels it with a force of 1 dyne. The force of attraction or repulsion between two charged spheres is directly proportional to the product of the charges and inversely proportional to the square of the distance between them. This force in air may be exactly calculated from the formula $f = \frac{Q — Q_1}{d_2}$ where f is the force, Q and Q_1 the charges, and d the distance between the centres of the spheres. Again, the potential at a point in an electric field is defined as the amount of work done by or against the electric forces in bringing a positive unit of electricity from an infinite distance up to the point. If the work done is 1 erg, the potential is 1. For a sphere $v — \frac{Q}{r}$, where v is the potential, Q the charge, and r the radius. Lastly, the capacity of a body is its charge, when its potential is 1. The fundamental equation connecting quantity, potential, and capacity for any body is Q—V C. An arrangement of conductors separated by a thin dielectric is termed a *condenser*, and is particularly useful in many connections (*e.g.*, telegraphy, telephony, wireless communications, etc.) on account of its high capacity.

ELECTRO-THERAPEUTICS, a term applied to the use of electricity for the cure of disease. The treatment of lupus and other skin diseases employs the action of the X-rays or of other rays discovered by Finsen, special electric lamps being employed; while X-rays have also proved of benefit in cancers and other new growths, retarding their progress and diminishing their size, and in leucocythaemia by diminishing the size of the spleen.

Enlarged and diseased tonsils, under the application of X-rays shrink and disappear. The permanence of the cure has however been questioned.

So-called Electrolysis is the best method of removing superfluous hair and moles. Electric treatment is also used to promote the coagulation of blood in the sacs of aneurisms, for the treatment of inflammation of the internal lining of the uterus, for rodent ulcer, for ankylosis or adhesions of joints, and for adhesions in the pleura and elsewhere. The sphere of its application is being gradually extended, a very recent addition consisting in the passage of a current through the thorax, as a therapeutic measure in pneumonia cases. Both continuous and interrupted currents are used in the treatment of nervous affections, infantile paralysis, neurasthenia, sciatica, chorea, etc., in wasting conditions after aneamia or any prolonged illness, for lumbago, rheumatism, and other painful conditions, very often in combination with massage. The so-called 'electric' belts, rings, etc., depend, however, for their therapeutic powers, not on electricity, but on the faith of the individual who wears them.

ELEGY, stately poetic monody. Amongst the ancients the e. was not always funereal, often being patriotic or amatory. The classical form was an alternation of hexameter and pentameter verses, and famous early writers of thee. were Callimachus, Euphorion, Theocritus, Bion, Propertius, Tibullus, and Ovid. The form has long been a favourite with Eng. poets—Spenser, Milton, Donne, Gray, Shelley, Tennyson, Arnold, and others.

ELEMENT. Until recent years an element was defined as a substance which contains only one kind of matter or as one which could not be broken up into other substances with different properties. In view of recent chemical discoveries, these definitions, while remaining broadly true, must be accepted with some reservations. It appears, for instance, to be definitely established that some elements consist of a combination of two substances having slightly different atomic weights, but otherwise being practically identical. Lead and chlorine may be mentioned as examples. Then again, radio-active elements are apparently continually breaking down into elements of lower atomic weight, and the hypothesis is now put forward that all elements are built up from one or other of the two lightest elements known—hydrogen and helium. An element may therefore be described as a substance which takes part in chemical reactions as a single unit which cannot, by ordinary chemical means, be split up into two or more essentially differing substances.

Elements are built up of *atoms*, which are the smallest possible particles of matter that can take part in a chemical change. Assuming the weight of an atom of the lightest known element, *hydrogen*, as unity, by various methods—*e.g.*, chemical methods, methods based upon volumetric relations—the ratios of the weights of the atoms of the different elements to the weight of anatom of hydrogen may be found, these being termed *atomic weights*. There are believed to be ninety-two possible elements. Eighty-four are at present known, as shown in the following list, the symbol of each being given immediately after it: Aluminum, Al; Antimony, Sb; Argon, A; Arsenic, As; Barium, Ba; Bismuth, Bi; Boron, B; Bromine, Br; Cadmium, Cd; Caesium, Cs; Calcium, Ca; Carbon, C; Cerium, Ce; Chlorine, Cl; Chromium, Cr; Cobalt, Co; Columbium or Niobium, Cb or Nb; Copper, Cu; Dysprosium, Dy; Erbium, Er; Europium, Eu; Fluorine, F; Gadolinium, Gd; Gallium, Ga; Germanium, Ge; Glucinum or Beryllium, GL or Be; Gold, Au; Hafnium, Ha; Helium, He; Holmium, Ho; Hydrogen, H; Indium, In; Iodine, I; Iridium, Ir; Iron, Fe; Krypton, Kr; Lanthanum, La; Lead, Pb; Lithium, Li; Lutecium, Lu; Magnesium, Mg; Manganese, Mn; Mercury, Hg; Molybdenum, Mo; Neodymium, Md; Neon, Ne; Nickel, Ni; Niton, Nt; Nitrogen, N; Osmium, Os; Oxygen, O; Palladium, Pd; Phosphorus, P; Platinum, Pt; Potassium, K; Praseodymium, Pr; Radium, Ra; Rhodium, Rh; Rubidium, Rb; Ruthenium, Ru; Samarium, Sa; Scandium, Sc; Selenium, Se; Silicon, Si; Silver, Ag; Sodium, Na; Strontium, Sr; Sulphur, S; Tantalum, Ta; Tellurium, Te; Terbium, Tb; Thalium, Tl; Thorium, Th; Thulium, Tm; Tin, Sn; Titanium, Ti; Tungsten, W; Uranium, U; Vanadium, V; Xenon, X; Ytterbium, Yb; Yttrium, Yt; Zinc, Zn, Zirconium, Zr. In addition to the above, the existence of the following elements has been announced: Yhrium, A; Celtium, Nebulium, Donebium, Dubhium, and Eurosamarium. They have not however, been fully investigated.

When the elements are arranged in order of their atomic weights, those which correspond in order in each series of eight have similar chemical and physical properties (Mendeléeff's law) —a law now modified by the inclusion of the argon group of elements (inert gases), and there are gaps in the series representing elements which have not yet been discovered. This law is applied in grouping the elements—the periodic system. The properties of the elements

PERIODIC SYSTEM OF ELEMENTS

	Group O (Inert Gases)	Group I	Group II	Group III	Group IV	Group V	Group VI	Group VII	Group VIII
1	—	H	—	—	—	—	—	—	—
2	He	Li	Be	B	C	N	O	F	—
3	Ne	Na	Mg	Al	Si	P	S	Cl	—
4	A	K	Ca	Sc	Ti	V	Cr	Mn	Fe,CoNi
5	—	Cu	Zn	Ga	Ge	As	Se	Br	—
6	Kr	Rb	Sr	Yt	Zr	Nb	Mo	—	Ru,RhPd
7	—	Ag	Cd	In	Sn	Sb	Te	I	—
8	X	Cs	Ba	La	Ce	Nd	—	Sa	—
9	—	—	—	Gd, Tm	—	—	—	—	—
10	—	—	—	Yb	—	Ta	W	—	Os,Ir,Pt
11	—	Au	Hg	Tl	Pb	Bi	—	—	—
12	Nt	—	Ra	—	Th	—	U	—	—

Dysprosium, Erbium, Europium, Lutecium, Praseodymium, and *Terbium* are not sufficiently known to place them in their proper group, while the discovery of the radio-active elements may disturb Mendeléeff's grouping.

In the diagram the elements are arranged in lines from left to right in order of their atomic weights, while the vertical lines cut them off into groups in which the elements resemble one another chemically and physically, each group being again arranged in two vertical columns of those elements which ,in each group, most resemble one another. There are certain exceptions to this rule —*e.g.*, argon should come after potassium in the order of atomic weights, but it must be put before to bring it within its proper group; these exceptions are due to some unknown disturbing factor which cannot yet be explained.

ELEMI, resin used in varnishes, exported from Philippine Islands.

ELEPHANT. The two modern species of elephants and their extinct relatives are grouped in a sub-order of Ungulates, Proboscidea, but they are far removed from the Even- and Odd-Toed groups of that order. They present strange contrasts, for, although their skull, trunk, and teeth are peculiar and highly specialised, their limbs are vascular system are of an elementary character.

Modern elephants are large, clumsily built animals, with enormous heads and ears. Their skin is thick and hard, furnished with few bristly hairs; their limbs thick, with low knee-joint in the hind leg, and terminating in broad circular five-toed feet. Most peculiar is the extension of the nose into a long, mobile, sensitive proboscis or trunk, which bears the nostrils at its end, and is produced into two lips capable of grasping the foliage and shoots upon which the animals feed. The teeth also are peculiar, for the upper incisors are prolonged into huge tusks of solid ivory, while the back teeth or molars are very large; their grinding surfaces present many transverse ridges, and, although six or seven occur on each side, only one or portions of two are in use at once, these, as they become worn, being ejected and replaced by another of the series. The only living species are the frequently domesticated Indian Elephant (*Elephas maximus*), found in India, Ceylon, Burma, Siam, Malay, Sumatra, and Borneo, and the African Elephant (*E. africanus*), occurring in Africa in the Sudan and southwards to the Zambesi. The former has moderate ears, parallel ridges on the teeth, the upper lip of the proboscis long and finger-like and four or five hoofs on the hind feet; the latter has very large ears, lozenge-shaped ridges, no finger-like process, and only three hoofs on the hind feet.

The gigantic extinct Mammoth (*E. primigenus*), of Pleistocene times, had enormously long, curved tusks and a long, hairy coat. The Mastodon, whose whose remains are found in Tertiary formations in Europe, India, and America had almost straight tusks; while in the European and Asiatic *Dimotherium* the tusks, pointing vertically downwards, were set in lower jaw.

ELEPHANT BUTTE DAM. See Dams.

ELEPHANT SHREW, JUMPING SHREW (*Macroscelides*), African insectivorous mammal with long snout; long hind legs facilitate jumping gait.

ELEPHANTA ISLE (18° 56′ N., 72° 54′ E.), island, off Bombay, India; ha rock temples containing Hindu religious statues; named after stone elephant which formerly stood near landing-place.

ELEPHANTIASIS, BARBADOS LEG, tropical disease, due to the obstruction of the lymphatics by parasites, filariae, and their embryos, affecting mainly the leg and scrotum.

ELEPHANT'S FOOT, TORTOISE PLANT, HOTTENTOT BREAD (*Testudinaria elephantipes*) S. African twining plant (*Diocoeaceoe* order); bark resembles elephant's hide.

ELETS (52° 45′ N., 38° 30′ E.), town, Orel, Russia; cattle and grain. Pop. 50,000.

ELEUSIS (38° 2′ N., 23° 32′ E.), ancient Gk. city, in Attica, about 14 miles N.W. of Athens, of great antiquity and famed mostly for its mysteries. Excavations have revealed many ancient buildings, possibly destroyed by Goths 396 A.D.; now small village.

ELEUTHEROPOLIS (31° 36′ N., 34° 56′ E.), former town, Palestine, hear Jerusalem.

ELEVATORS, the conveyances used as a means of transit for carrying people and goods up and down high buildings, driven by hydraulic or electric power. Their use, in the form of primitive hoists operated by cables, dates from about the middle of the nineteenth century. The device originally lacked all the safeguards of the present-day conveyances. It developed slowly by provision for stopping the car's descent should the hoisting cables break, the installation of steam engines connected with the hoisting equipment, the displacing of steam by hydraulic power, the adoption of perfected electric motors instead of hydraulic devices, and a variety of controlling appliances. The last named include improved means of arresting a car's fall by the operation of centrifugal governors, which check the car's speed when it goes beyond a fixed maximum rate; the use of steel instead of wood for guide rails; safety grips that stop a car without disturbance or danger to passengers; automatic stops at floors; and door locks that check the cage's movement while the door is open and also keep the door closed till the car is at rest.

There are belt-driven elevators, usually hitched to a ceiling, slow of speed and used for freight service in factories. Steam elevators have long since been discarded. The hydraulic method, adopted about 1871, began to be used less after 1890, the electric motor having meantime been successfully applied to elevators.

A modern hydraulic type is the plunger, used for high speed passenger service, which operates from a cylinder set vertically in the ground and as long as the distance from the basement to the top floor. The plunging device is a piston of the same length operated by the cylinder, and carries the car on its top. A high pressure is produced by the small area of this plunger. A weight attached to the car frame partly balances the weight of car and plunger. The elevator is controlled by a lever which sends water from the top into the cylinder for the ascent and draws off the water for descending. Another type is the horizontal cylinder machine, which (like the old vertical geared nethod ousted by the plunger) has a piston that operates a number of nultiplying sheaves. Water pressure isually comes from steam or electrically lriven pumps, which deliver the water nto a pressure tank and utilize the vater again when it is ejected into a lischarge tank. In some hydraulic nachines air-pressure is used with water oower. This is the aero-hydraulic nethod by which an elevator goes up y the simultaneous admission of air nto a partly filled water tank and of vater from the tank into the cylinder, vhile in descending the air is discharged nd the water returns to the tank from he cylinder. Another hydraulic type is hat in which steam is combined with vater, known as the hydro-steam levator. The operation is the same as vith the aero-hydraulic method except hat steam is used instead of air.

The modern electric elevator differs undamentally from ᵗhe hydraulic type n that its speed is virtually independent f its load and can be operated by a lower power consumption. A worm shaft connects the motor to winding machinery, and on the shaft are brake devices. In operation, the moving of the lever or switch sends current to th motor, and the rest is automatic action. A series of magnets control the current to the capacity of the motor, ensuring smooth acceleration of the elevator once set in motion. The present efficiency of electric elevators, added to their safety-devices, lies in the application of alternating-current systems after the vogue of the direct-current method had become a rival of the hydraulic type. The alternating-current elevators have polyphase induction motors for several speeds and are equipped with magnets of sufficient power to operate controller and brake.

In mine hoists, with their great depth, sometimes 2,300 feet, and the need of high speed of ascent, steam is the invariable motive power. Elevators for grain and coal are installed in special structures where the hoisting and conveying machinery bulk so large that the building and plant are known as elevators. Hoisting conveyers used for handling cement and ore, as well as grain and coal, have an endless belt passing over pulleys, and to the belt are attached metal buckets or other types of containers in series, the buckets being loaded from a hopper at the foot, and discharging their contents when passing round the top pulley.

ELF, mischievous supernatural dwarf, the cause of many ills and much tangling of human affairs.

ELGAR, SIR EDWARD WILLIAMS (1857), Eng. musical composer; prof. of music, Birmingham Univ. 1905-8; more important compositions include overture, *Froissart* (Worcester Festival, 1890), suite, *Scenes from Bavarian Highlands*, and short overture, *Lux Christi* 1896; attracted wide notice with *Scenes from the Saga of King Olaf* (N. Staffordshire Festival, 1896); *Caractacus* (Norwich Festival) in 1900 came his finest work, *The Dream of Gerontius* (Norwich Festival); *In the South*; *The Apostles* and *The Kingdom* (oratorio), etc.

ELGIN. (1) (57° 39′ N., 3° 19′ W.), city and royal burgh, in Elginshire, Scotland; has ruins of a fine cathedral (founded 1224). Pop. 9,000.

ELGIN, a city of Illinois, in Kane co. It is on both sides of the Fox River. It is on the Chicago and Northwestern and the Chicago and Pacific railways. The river at this point is spanned by a large and handsome bridge. The water power for the varied industries is supplied by the river. Elgin is notable for the manufacture of watches, and the Elgin watch works has its extensive plants here. The condensed milk industry is also of great importance. There are butter and cheese factories, boiler works, shoe factories and sewing machine works. There are several educational institutions including the Elgin Academy, St. Mary's Academy, and public high schools. Here also is the Illinois Northern Hospital for the Insane. There is a Gail Borden free library, parks and many handsome private buildings. Pop. 1920, 27,431.

ELGIN MARBLES, the famous collection of ancient Greek sculptures, brought to Eng. *c.* 1812 through the agency of the seventh Earl of Elgin, after whom they are named, and acquired for the British Museum 1816. They are portions from the Parthenon (designed by Phidias) and other buildings on the Athenian Acropolis. Elgin's act was denounced as 'vandalism,' but if left, these treasures would probably have been destroyed by the Turks.

ELGINSHIRE OR MORAY (57° 39′ N., 3° 19′ W.), county on S. shore of Moray Firth, Scotland, forming central division of old Province of Moray. Capital, Elgin. Total area, 485 sq. miles. Pop. 1921, 41,561.

ELGON, LIGONYI, MASAWA (1° N., 34° 40′ E.), extinct volcano, Uganda, Africa.

EL HASA, a coast district of Arabia, comprised in the emirate of Nejd and Hasa. The Turks were expelled from Hasa in 1913 and a semi-independent emirate was established under the protection of Great Britain. The capital is Riyadh. Pop, about 50,000.

ELI, high priest and judge of Israel; suffered because of evil courses of his sons Hophni and Phinehas; on hearing of capture of the Ark of the Lord E. fell from his seat and broke his neck (*1 Samuel* 4_{18}).

ELIE DE BEAUMONT, JEAN BAPTISTE ARMANDE LOUIS (1798-1874), Fr. geologist; was prof. of Geol. at *Ecole des Mines et College de France.*

ELIJAH, Old Testament prophet, appears suddenly in *1 Kings* 17; fed by ravens and received by widow of Zarephath. The greatest scene in his life is that with the prophets of Baal on Mount Carmel; not less wonderful is the scene on Mount Horeb when the Lord was in the 'still small voice.' E. is commanded to anoint Jehu as king; later he denounces Ahab; calls down fire from heaven to destroy soldiers of Ahaziah; at length is translated to heaven.

ELIOT, CHARLES WILLIAM (1834), American college president and author *B.* in Boston, March 20, 1834. He graduated from Harvard in 1853, and was tutor there 1854-1858; assistant professor of mathmatics and chemistry at the Lawrence Scientific School, Harvard 1858-1863. He then spent several years in Europe studying chemistry and educational methods and on his return to America was professor of chemistry in the Massachusetts Institute of Technology, 1865-1869; President of Harvard, 1869 to 1909, when he retired. President Ementry of Harvard University since that date. In the first rank among American educators, his writings on social problems, etc. have had a wide influence. He introduced the elective system in Harvard which enables students to choose (within certain groups) the course of studies they wish to follow. He reduced the regular college course from four to three years, and the professional course from seven to six. For services to higher education he has been decorated by France with the Legion of Honor, by Italy with th Order of the Crown, by Japan with the Order of the Rising Sun, and by Germany with the Royal Prussian Order of the Crown' 1st class. Order of the Crown of Belgium, 1919. In 1913 President Wilson offered to appoint him Ambassador to Great Britain, which he declined He was President of the American Association for the Advancement of Science 1914-1913. Among his works are 'Manual of Qualitative Chemical analysis' (with F. H. Storer) 1869, 'American Contributions to Civilization' essays; 'Four American Leaders' 1906; 'The Durable Side of Life.' and 'The Road to Peace' 1915. Member of General Educational Board 1908-1917; Rockefeller Foundation 1914-1917. Has delivered many noteworthy addresses upon educational and scientific subjects. Has contributed many articles to leading reviews, magazines and to the press.

ELIOT, GEORGE (1819-80), Eng. novelist and poetess; pseudonym of Mary Ann Evans. She early began to abandon orthodox views on religion and morals. In 1846 she produced a trans. of Strauss's *Life of Jesus.* She undertook a continental tour in 1849; and in 1851 became associated with the *Westminster Review.* Amongst her friends of this period were Herbert Spencer, Carlyle, and George Henry Lewes and with the last-named she formed an irregular connection which lasted until his death in 1878. Lewes undoubtedly inspired most of her best work. She married J. W. Cross in 1880, and died soon after. Her first effort in fiction was *Amos Barton,* which appeared in *Blackwood's* in 1857, and was followed by the two other stories which make up *Scenes of Clerical Life* 1858. *Adam Bede* came out in 1859, met with instant success, and is generally considered to be her finest work. Succeeding this came *The Mill on the Floss* 1860. *Silas Marner* 1861 and other novels. Besides these, she wrote a volume of essays, *Theophrastus Such* 1876; *The Spanish Gypsy* 1868, a drama; and *The Legend of Jubal and other Poems* 1874.

ELIOT, JOHN (1604-1690) clergyman and missionary. 'Apostle to the Indians.' *B.* at Widford, Eng. in 1604. He graduated from Cambridge, became a nonconformist and came to Boston in 1631 and after preaching a year there, settled in 1632 at Roxbury, Mass. as 'teacher' to the church. He learned Pequot from an indian prisoner and first preached to the indians in that tongue in 1646. He travelled all over Massachusetts where Indians were to be found, and established his converts in villages, the first being Natick. He was of great service to the colonists in King Philip's War 1675. He published the first Indian Catechism in America in 1653, an Indian Bible in 1658; New Testament 1661, Old Testament 1663, and an Indian Grammar and Primer, and assisted in preparing the famous Bay Psalm Book. His 'Christian Commonwealth' was considered seditious 1659 and the Governor and Council forced him to retract some statements.

ELIOT, SIR JOHN (1592-1632), Eng. statesman, knighted, 1618; in 1626 became leader of the House of Commons; imprisoned in the Tower several times; finally, 1630, for his continued opposition to the king's absolutism; *d.* in prison refusing to submit.

ELIOT, SAMUEL (1821-1898), American educator and historian. *B.* in Boston December 22, 1821; *d.* at Beverly, Mass. September 14, 1898. He was professor of history and political science at Trinity College, Hartford 1856-1864; president 1860-1864; lecturer on history at Harvard 1870-1873; head of Girls High School, Boston 1873-1876; superintendant Boston Public Schools 1876-1880. Author of a 'History of Liberty'. 'The Liberty of Rome', 'Life and Times of Savonarola', 'Stories from the Arabian Nights' and a 'Manual of U. S. History for the Years 1492 to 1850.'

ELIOT, SAMUEL ATKINS (1862),b in Cambridge, Mass. Was graduated from Harvard College in 1884 with a Bachelor of Arts degree and received his Master of Arts in 1889. Doctor of Divinity, and in 1915 received his Doctor of Laws from Western Reserve University. From 1889-1893 was minister of the Unity church at Denver, Colo., and at the church of our Savior in Brooklyn, N. Y. 1893-1898. Member of various boards including Indian Commissioners and editorial board Hibbert Journal. He was vice-president Massachusetts Federation of Churches.

ELIS OR ELEIA (37° 50′ N., 21° 30′ E.), district, S. Greece, coast of Peloponnesus; was divided into three portions: N., Elis, capital, Elis; centre, Pisatis, capital, Pisa; S., Triphylia, capital, Pylos; country held sacred and inhabitants privileged, owing to Olympic festival which took place near Pisa every four years; prosperity ended by Peloponnesian War.

ELIS (37° 53′ N., 21° 22′ E.), ancient city, Elis, Greece; traditional founder, theÆtolian, Oxylus; had various temples and gymnasia.

ELISAVETGRAD (48° 32′ N., 32° 18′ E.), town, Kherson, Russia; important trade centre. Pop. 68,000.

ELISAVETPOL (40° 30′ N., 46° 30′ E.), province, Transcaucasia; area, 16,991 sq. miles; includes parts of Kur valley, Armenian plateau, Caucasus. Pop. 1,007,800. Chief town, **ELISAVETPOL** (40° 42′ N., 46° 17′ E.). Pop. 46,000.

ELISHA, Old Testament prophet, successor of Elijah (*q.v.*), with whom he is closely associated. His life is a loose collection of incidents, with many miracles wrought by him. He appears a gentler and kindlier figure than his master. The healing of Naaman the Syrian of leprosy (2 *Kings* 5) suggests the healing miracles of Christ.

ELIZABETH, a city of New Jersey, in Union co., of which it is the county seat. It is on the Pennsylvania, the Lehigh Valley, the Baltimore and Ohio, the Philadelphia and Reading, the New Jersey Central railroads, and on Staten Island Sound, 14 miles southwest of New York City. Elizabeth is well laid out and covers a broad expanse of level land. It is notable for the large number of handsome private residences and is a favorite residential place for business men from New York. It is very important industrially and has manufactures of sewing machines, oilcloths, hats, saws, stoves, hardware, edged tools, etc. It has also large business in the shipment of coal, especially of anthracite. Shipbuilding is carried on on a large scale, and during the World War many naval and other vessels were constructed here. The educational system of the city is of a high standard and there are several high-schools, a business college, and many private educational institutions. Among the public institutions are the Alexian Brothers Hospital, a General Hospital, orphan asylum, home for aged women and a public library. There are many old and handsome churches. The city has a considerable historic interest and was settled in 1665 as Elizabethtown, and from 1755 to 1757 was the capital of the State. Here is still an old tavern in which Washington stopped on his journey to New York for his first inauguration as President. Among other historic buildings are the former home of General Winfield S. Scott, the Bodenoit House, and the Livingston Mansion. Pop. 1920, 95,682.

ELIZABETH (1533-1603), Queen of England and Ireland, *d.* of Henry VIII. and Anne Boleyn; *b.* London; placed after Edward and Mary in list of succession, was imprisoned for two months in the Tower for suspected complicity in Wyat's rebellion 1554. The Protestant party welcomed her accession 1558 after Mary's persecution; she at once endeavoured to impose uniformity in religion. Her foreign policy was always diplomatic, her finance economical, but diplomacy and economy developed into vacillation and parsimony. She was intensely jealous of Mary Stuart, and indeed of all women, but, largely for political reasons, was unable to marry and had to console herself with flirtations; her affection for Essex was certainly genuine. E.'s work terminated with the destruction of the Armada; she had carefully husbanded England's resources in case of war, and when England's position was made secure she had achieved her end. She grew old and peevish, embittered by the fact that she was the last of her line. As her successor she favoured James VI. of Scotland

ELIZABETH (1596-1662), e. *d.* of James I. of England; married 1613, Frederick V., Elector Palatine and king of Bohemia; was *m.* of Sophia, *w.* of Ernest, Elector of Hanover, *m.* of George I., on whose descendants the Brit. Crown is settled by Act of Parliament.

ELIZABETH, EMPRESS OF AUSTRIA, AMÉLIE EUGÉNIE (1837-98), *d.* of Duke Maximilian in Bavaria; married Emperer Francis Joseph II. of Austria; murdered at Geneva.

ELIZABETH MARIE HÉLÈNE (1764-94), Fr. princess; usually called 'Madame Elizabeth'; *s.* of Louis XVI., to whose cause she was devoted, and for which she was guillotined.

ELIZABETH PETROVNA (1709-62), Empress of Russia; *d.* of Peter the Great and Catherine I.; during the reign of the Empress Anne, E. lived chiefly in retirement; in 1741, however, by a bold and swift plot she seized the throne; she made peace with Sweden; during the Seven Years War she did her utmost for Russia and to counteract Prussia.

ELIZABETH, Queen of Rumania. See CARMEN SYLVA.

ELK. See DEER FAMILY.

ELIZABETH, ST. (1207-31), of Hungary; married Lewis IV., landgrave of Thuringia.

ELIZABETH CITY, a city of North Carolina, in Pasquotank co., of which it is the county seat. It is on the Norfolk and Southern and the Virginia and Carolina Coast railroads, and on the Pasquotank River. Its industries are important and include the manufacture of lumber, cotton and oyster fishing. There are saw-mills, cotton factories, hosiery mills, iron works, brick works, etc. Pop. 1920, 8,925.

ELISABETHVILLE, town, Katanga, Belg. Congo; copper mines; connected by rail with Cape Town.

ELKHART, a city of Indiana, in Elkhart co. It is on the Big Four, the Lake Shore, and St. Joseph Valley, the Chicago, South Bend and Northern Indiana railroads, and at the junction of the St. Joseph and Elkhart rivers, 101 miles E. of Chicago. It is an important railrod center and a shipping point for a large agricultural region which surrounds it. Abundant water power is furnished by the rivers and in 1913 a large dam and power house were erected. The city has important industries, including the manufacture of brass, carriages, machinery, gas generators, rubber and paper. The railroad shops of the Lake Shore Road are here. It has an excellent public school system, business colleges, and is the seat of Elkhart Institute. Pop. 1920, 24,277.

ELKINS, a city of West Virginia, in Randolph co., of which it is the county seat. It is on the Western Maryland and the Coal and Coke railroads. It is an important industrial community and has canneries, and locomotive and car repair shops. There are also plants for the manufacture of boxes and extracts. Here is Davis and Elkins College. There also an Odd Fellows' Home, a hospital and other public institutions. Pop. 1920 6,788.

ELKINS, DAVIS (1876), United States Senator. *B.* in Washington. He is a *s.* of United States Senator Stephen B. Elkins. He left Harvard to join the first West Virginia Infantry in 1898. He was first Lieutenant and later Captain on staff of Brigadier General Schwan. He left the army to assume charge of his father's business interests. Served as Major during World War. During his absence was elected to the senate to serve from 1919-1925.

ELKINS, STEPHEN BENTON (1841-1911) American politician. *B.* in Perry County, Ohio, September 26, 1841; *d.* June 4, 1911. At an early age he moved to Missouri and graduated from the University of Missouri in 1860. Admitted to the bar in 1864 he practiced law for some years and then moved to New Mexico, and was a member of the Territorial legislature 1864-1865. Territorial delegate to Congress, 1873-1877. He then moved to West Virginia and was engaged in great business enterprises, especially in Virginia coal fields, and was vice-president of the West Virginia Central and Pittsburgh Railroad. He was Secretary of War 1891-1893, and in 1894, 1900, and 1907 was elected to the U. S. Senate. Author of the 'Elkins Railroad Law.'

ELKS, BENEVOLENT AND PROTECTIVE ORDER OF, a fraternal organization in the United States, founded in New York in 1868 by the members of a pre-existing society, known as 'The Jolly Corks.' The Grand Lodge was incorporated in 1871 and empowered to form branch lodges. Membership is open to all white males of good moral character over the age of twenty-one. Members may form branch lodges only in cities with a population over 5,000. At the last national convention of the order, held in Atlantic City, N. J., on July 11, 1922, it was reported that the membership stood then at approximately 850,000, these being found principally in New York, 70,862; Pennsylvania, 66,793; California, 49,995, and Ohio, 49,066. The biggest lodge was that of Brooklyn, N. Y., with a membership of 10,328. In 1921 the organization disbursed a charity fund amounting to $2,044,218.

ELL, 'arm-length,' measure used chiefly for cloth; Eng. e. was 45 inches, Scot. 37, old Dutch, 27.

ELLA OR *ÆLLA* (*d.* 588), 1st king of the Deirans after their separation from the Bernicians 559. E. was also the name of a S. Saxon king fl. 477-515; and of a Northumbrian king *d.* 867, famed for his exploits against the Danes.

ELLAND (53° 41′ N., 1° 50′ W.), town, Yorkshire, England. Pop. 10,500.

ELLENBOROUGH, EDWARD LAW, 1ST BARON (1750-1818), Eng. lawyer; Attorney-Gen. 1801; cr. baron, 1802; Lord Chief Justice of King's Bench, 1802-18; Chancellor of Exchequer, 1806.

ELLENBOROUGH, EDWARD LAW, EARL OF (1790-1871), Brit. statesman; succ., 1818; Lord Privy Seal, 1828; app. Gov.-Gen. of India, 1841.

ELLESMERE LAND, the northernmost part of the North American Continent, discovered in 1616 by Baffin. It is a rugged plateau region, uninhabited save for hunting parties of Esquimos, which occasionally come there to hunt reindeer, musk oxen and wolves. It is still imperfectly explored. In 1899 the Norwegian Arctic explorer, Otto Sverdrup, made the first really thorough survey of its western portion, on which are based the modern maps of the land. It is separated from Greenland by Smith Sound.

ELLESMERE, FRANCIS EGERTON, 1ST EARL OF (1800-57), Eng. statesman and poet; Irish Sec. 1828-30; subsequently Sec. for War.

ELLICE OR LAGOON ISLANDS. A group of islands in the Pacific, discovered in 1781 by Maurelle and annexed by Great Britain in 1892. They extend 360 miles and are located to the N. of Fiji and N.W. of Samoa, between latitude 5° and 11° S. and longitude 176° and 180° E. Area 15 miles. Samoan is the dialect spoken. The natives are Christian and all can read and write. Pop. 3,084. The chief produce of the islands are copra, shark's fins, guano, cocoanuts and fruit. See GILBERT and ELLICE ISLANDS, COLONY.

ELLICHPUR, ILLICHPUR (21° 16′ N., 77° 30′ E.), town, Berar, India; has trade in cotton and forest produce. Pop. 26,000.

ELLIOTT, MAXINE (1873), American actress. Her first stage appearance was with E. S. Willard, in 'The Middleman' 1890. She was with Rose Coghlin in 1895, and went to London with Daly's Company. In 1896 she acted with Nat. C. Goodwin, whom she later married. She appeared in Fitch's 'Nathan Hale' in 1898, and played Portia in the 'Merchant of Venice' 1901. Since 1908 she has owned the Maxine Elliot Theatre, New York City. She resides in England, and in recent years has appeared in public only in moving-pictures.

ELLIOTT, EBENEZER (1781-1849), Eng. poet; 'Corn Law Rhymer'; pub. *Corn Law Rhymes* 1831 and other volumes dealing with working-class life

ELLIOTT, GEORGE FRANK (1846), Major General U. S. Marine Corps. *B.* in Alabama. In 1870 joined the United States Marine Corps. He had various promotions and in 1903 was made a Major General. He commanded Marine guard of the U.S.S. Alliance. Guarded American Interests in Seoul, Korea in 1894. and also during China and Japan War. Commanded a Battalion of Marines during Spanish American War. For conspicuous bravery at Guantanemo was advanced three numbers in his grade. He is now retired.

ELLIOTT, GERTRUDE, American actress. *B.* at Rockland, Maine, is a *s.* of Maxine Elliott. Educated at public school and Normal College. On December 22, 1900, was married to J. Forbes-Robertson in London. In Saratoga New York in September, 1894, she made her professional debut and under the management of Liebler and Company starred alone 1910-1912. Was the star of 'Eyes of Youth' in London in 1918.

ELLIOTT, HOWARD (1860*0*, *b.* in New York, educated at Cambridge, Massachusetts High School,Harvard and Middlebury College. Was clerk in auditor's office and auditor for the Chicago, Burlington and Quincy Railroad. Has been General freight agent of four roads of the Burlington System. From 1896-1902 was General manager for the same roads. In 1902 he was elected vice-president. He was president of numerous railroads and a director of the Western Union Telegraph Company, Rutland Railroad, National Surety Company and New York, New Haven and Hartford Railroad. On executive committee of La Purchase Exploration Company. He was a member of the American Railway Association. Chairman of Northern Pacific Railroad and was president from 1917-1920.

ELLIOTT, JOHN (1858), American painter. He was *b.* in England and studied art at Julian's and with Carolus Duran, Paris, and Villages, Rome. One of the finest examples if his mural work is the ceiling of the Boston Public Library 1894-1901. 'Diana of the Tides' a mural painting, and considered his masterpeice, adorns the New York National Museum, Washington. A distinguished portrait artist in red chalk, pastel, and silver point among notable works are the portraits of his mother-in-law, Julia Ward Howe in Metropolitan, New York. 'Humbert, King of Italy, (in possession of royal family) Lord Ava and Marquis of Winchester. A pastel 'Study of Dante' (property of Mrs. David Kimball) is world famous. He has also illustrated fairy books for children. He accompanied the Red Cross Expedition to Italy for the relief of the sufferers from the Messina earthquake, and was architect of the American village there. Was decorated by Italy and Spain. In 1917 the Newport Art Association awarded him the 'Peoples Prize.'

ELLIOTT, MAY GERTRUDE (LADY FORBES-ROBERTSON), Amer. actress; began her career in Nat Goodwin's company; in England has played variety of parts, including Ophelia in *Hamlet*, and Desdemona in *Othello*; married Dec. 1900, and has since played leading parts in her husband's company.

ELLIOTT, MAUD HOWE (1854-1922), American novelist and author, *d.* of Julia Ward Howe (*q.v.*). *B.* in Boston November 9, 1854. Her novels include 'A Newport Aquarelle' 1883; 'Atlanta in the South' 1896; 'Mammon' 1898; 'Honor and Phyllida, 1903; 'Roma Beata' 1904. Books of travel, 'Two in Italy' 1905; 'Sun and Shadow in Spain' 1908 and 'Shadow and Sun in Sicily, 1910. Other books are 'The 11th Hour in the Life of Julia Ward Howe, 1911, and she edited with Laura E. Richards 'Life and Letters of Julia Ward Howe' 1915.

ELLIPSE is defined as the locus of a point the sum of whose distances from two fixed points is constant. It is also an equation of the secondary degree, the highest terms of which represent two imaginary lines. The orbit of a particle, moving under the influence of a central force, which varies inversely as the square of the distance of the particle is an ellipse. Certain sections of cones and cylinders are e's.

ELLIS, ALEXANDER JOHN (1814-90), Eng. philologist and miscellaneous writer.

ELLIS, HENRY HAVELOCK, L.S.A. *b.* 1859, a fellow of the Medico-legal Society of New York, *b.* in Croydon, Surrey. He was educated at St. Thomas's Hospital, and from 1875-79 was engaged in teaching in New South Wales. Returning to England, he practised as a doctor, but soon abandoned this profession to devote himself to literature. Hispublications include *Man and Woman; A Study of Human Secondary Sexual Characters*, 1894 and 1904; *The Evolution of Society° The Task of Social Hugiene° Little Essays of Love and Virtue.*

ELLIS, SIR HENRY (1777-1869).

Eng. librarian and antiquary; Chief Librarian, Brit. Museum 1827-56.

ELLIS, WILLIAM (1794-1872), Congregationalist missionary in South Sea Islands and Madagascar; wrote *Polynesian Researches* 1829.

ELLIS ISLAND, an island in New York Harbor. It contains the buildings in which immigrants are landed and examined prior to their admission to the United States. It has been used for this purpose since 1829. In normal years hundreds of thousands of immigrants are landed here from vessels which bring them from Europe and other parts of the world.

ELLISTON, ROBERT WILLIAM (1774-1831), Eng. actor; excelled in Shakespearean plays.

ELLORA (20° 2′ N., 75° 11′ E.), village, Hyderabad, India; its rock temples and caves are among finest in India.

ELLORE (16° 41′ N., 81° 8′ E.), town, Madras, India. Pop. 34,000.

ELLSWORTH, EPHRAIM ELMER (1836-61), American soldier. *B.* in Mechanicsville, N. Y. April 23, 1837; *d.* at Alexandria, Va. May 24, 1861. Early in life he moved to Chicago where he studied law and organized a cadet corps which toured the country in 1861, and created a sensation by marvellous precision in drilling. A friend of Lincoln he suggested a Bureau of Militia in the War Department, which he was appointed to direct. He formed a zouave regiment of the firemen of New York City and became their Colonel. He was with the first Federal forces in Virginia and at Alexandria having torn down a Confederate flag waving from a hotel he was shot and killed by the hotel-keeper. At Lincoln's request his funeral was from the White House.

ELLSWORTH, OLIVER (1745-1807) an American statesman and jurist, *b.* at Windsor, Conn.; studied at Yale and Princeton, and practised law at Hartford, 1771. Was a member of the General Assembly of Connecticut, and held many legal and political offices in the state. Advised Washington to send Jay to England to negotiate a new treaty. Appointed by Washington Chief Justice of the Supreme Court, 1796, and was sent by Adams to France to negotiate a new treaty.

ELLSWORTH, WILLIAM WEBSTER (1855). *B.* in Hartford, Conn. He was a great-grandson of Noah Webster and Chief Justice Oliver Ellsworth. Educated in Boston at private schools. From 1881-1913 was secretary of the Century Company, New York. When he retired in 1916 was president. He lectured on literary topics and American History. He wrote a book, named 'A Golden Age of Authors', and was a member of the Mayflower Society.

ELLWANGEN (48° 58′ N, 10° 10′ E.), town, Württemburg, Germany; had Benedictine monastery. Pop. 5,000.

ELLWOOD, CHARLES ABRAM (1873). *B.* in New York. Educated at Cornell, University of Chicago and University of Berlin. Doctor of Philosophy and Fellow in Sociology of the University of Chicago. In 1899 he was professor of Sociology at the University of Nebraska. Since 1900 he has been professor of Sociology at the University of Missouri. He is the author of various books among which are 'Sociology and Modern Social Problems'; 'The Social Problem' 1915. In 1922 he wrote 'The Reconstruction of Religion' and 'A Sociological View'.

ELLWOOD, THOMAS (1639-1713), Eng. Quaker author; intimate friend of Milton.

ELM, genus *Ulmus*, natural order *Ulmaceoe*, trees and shrubs. Common elm. *U. campestris*) grows throughout Europe; has rugged bark, doubly serrate ovate leaves, numerous spreading, often pendulous, branches, and membranous green one-seeded seed-vessels.

ELMALI (39° 39′ N., 40° 5′ E.), town, Asia Minor. Pop. *c.* 4,000.

ELMAN, MISCHA (1891), Russian violinist. *B.* at Talnoi, Russia, of Russian parents January 20, 1891. He studied the violin under Fidelmann at Odessa and at the Imperial Conservatory, Petrograd. His first appearance in public was made in 1904 when he created a sensation as a boy prodigy. In 1905 he appeared in London and aroused the greatest enthusiasm. In Germany his success was equally brilliant. He played in New York in 1908 and again in 1917 and in each succeeding year and received ovations from the press and public.

ELMES, JAMES (1782-1862), Eng. architect and civil engineer; author of several books on arch. and allied arts.

ELMHAM, THOMAS (*c.* 1415), Eng. chronicler and ecclesiastic; chaplain to Henry V., whose life he wrote.

ELMINA (5° 8′ N., 1° 28′ W.), town, Gold Coast, Brit. West Africa; well fortified. Pop. 5,000.

ELMIRA, a city of New York, in Chemung co., of which it is the county seat. It is on the Lackawanna and Lehigh Valley, the Erie, and other railroads, and on the Chemung River and the Chemung canal, 46 miles southwest of Ithaca. Elmira is the chief city in that part of New York State. It is well laid out and has excellent commercial facilities, both by river and railroad. It is connected by the Chemung canal with Seneca Lake, and through this a large commerce moves. The city has great importance as an industrial center. The shops of the Erie and the North Central railroads are located here. There are also rolling mills, blast furnaces, boots and shoe factories, iron foundries, and the manufacturing and repair shops of the Pullman Car Company. Other industries include woolen mills, a steam fire engine manufactory, flour mills, carriage factories, and tanneries. Its nearness to the coal fields of Pennsylvania give it additional commercial importance and place it prominently among the industrial centers of the country. 20 miles south are important coal mines, and about the same distance southwest is the famous Blossburg soft coal field. Just outside the city limits are quarries of excellent stone. Elmira has many public and private institutions. These include State Reformatory, Elmira College, Elmira Industrial School, and Elmira Free Academy. There is also the Arnot-Ogden Hospital. There is an excellent school system, with high schools, Steel Memorial Library several parks, banks, monthly and quarterly periodicals and newspapers. Pop. 1920, 45,305.

ELMIRA COLLEGE. Elmira, N. Y. The first college for women in the United States, established in 1855, under Presbyterean auspices. It furnishes as high grade education as the men's colleges and confers the degrees B. S. B. Mus. and M. A. The library contains over 11,000 volumes. The annual income is about $90,000; productive funds $140,000. Students registered in 1922-1923, 485. Faculty 38.

ELMO'S FIRE. See St. Elmo's Fire.

ELNE (43° 37′ N., 3° E.), town, Pyrénées Orientales, S.W. France. Pop. 3,000.

EL OBEID (13° 16′ N., 29° 48′ E.), chief town, Kordofan, Sudan; extension of Cairo to Khartum railway was opened to El O., 1912; Hicks Pasha with Egyptian army defeated here by Mahdi, 1883; important trade centre for gum, ivory, cattle. Pop. 10,000.

ELOCUTION (Lat. *elocutio*, from *eloqui*, to speak out), a branch of oratory which teaches the art of effective speaking, especially public speaking, having regard solely to the utterance or delivery. It directs the proper use of gesture, the modulation of the voice, and deals generally with the methods of speaking. In ancient times E. held a prominent place in education, and great attention was paid to the study of it in Greece and Rome. Nowadays it is even more carefully cultivated in the U.S.A. than in Britain, its teaching having diminished in the latter country during the second half of the 19th century.

ELOI, ST., ELIGIUS (588-659) bp. of Noyon; first a goldsmith, then ordained and won converts in Netherlands.

EL PASO, a city of Texas, in El Paso co. of which it is the county seat. It is on the Atchison, Topeka and Sante Fe, and Texas and Pacific, the El Paso and Southwestern, the National of Mexico railroads, and on the Rio Grande River. It is a port of entry and is 712 miles N.W. of Austin. The famous El Paso del Norte, the chief thoroughfare between New Mexico and Mexico, by way of the mountains, is near the city. It is opposite Juarez, the northern terminus of the Mexican Central railroad in Mexico. El Paso has a large commercial and industrial importance. It has ore smelting establishments, and a considerable variety of manufactures. There is an extensive grain trade, as it is the center of a large agricultural and grain growing region. The notable public buildings include a county courthouse, Federal building and a high school. The State School of Mines is here. There are three National banks, and daily and weekly newspapers. Pop. 1920, 77,543.

ELPHINSTONE, MOUNTSTUART (1779-1859), Ind. statesman; went to India, 1796; served under Wellesley, showing great military capacity; resident at Poona, 1811; distinguished in war of 1817.

ELPHINSTONE, WILLIAM (1431-1514), Scot. statesman; a lawyer, afterwards bp. of Aberdeen, and lord high chancellor; helped to found univ. of Aberdeen, 1498.

EL RENO, a city of Oklahoma, in Canadian co., of which it is the county seat. It is on the Rock Island, and the St. Louis, El Reno and Western railroads, and on the Canadian River. It has important industries including the manufacture of cotton gins, machine shop products, brick, brooms, cement, washing machines, etc. Here are the repair shops and division offices of the Rock Island system. Pop. 1920, 7,737.

ELSINORE (56° 2′ N., 12° 36′ E.), port, Denmark, on island of Zealand;

shipbuilding and repairing; chief export, agricultural produce. Elsinore is the assumed setting of Shakespeare's Hamlet. Pop. 14,000.

ELSON, HENRY WILLIAM (1857), *b.* in Ohio. Bachelor of Arts of Thiel College in 1886 and in 1889 received his Master of Arts degree. In 1889 was graduated from Lutheran Theological Seminary, Philadelphia. He was Pastor of St. Johns Evangelist Lutheran Church at Kittanning, Pa. In 1905 he resigned the ministry to become a writer. At Ohio University in1905and until 1916 he was Professor of History and Economics. President of Ohio Valley History Association 1914-1915. He wrote Five Historical Biographies for Children and is an author of many other books among which are 'The Star-Gazers Hand Book,' 1902; 'Grammar School History of United States', 1905; 'Religion and the Tendency of Modern Science', 1921.

ELSSLER, FANNY (1810-84), Viennese dancer; rival of Taglioni.

ELSWICK (54° 58′ N., 1° 37′ W.), township, Newcastle-on-Tyne, England. Pop. 58,000.

ELTINGE, LEROY (1872). *B.* in Ulster co., N. Y. In 1896 graduated from the United States Military Academy. He was in command of various Cavalry Corps. In 1898 he was at the Presidio in San Francisco, and the Philippines from 1898-1899. While there he participated in several engagements. From 1903-1905 he was again at the Philippines. He was on the Operations section of the General Staff from 1917-1918. He has been decorated by the British, French, Italian and Belgium governments.

ELTON, CHARLES ISAAC (1839-1900), Eng. lawyer and antiquary; pub. *Tenures of Kent, Law of Copyholds, Custom and Tenant Right, Origins of English History.*

ELTZ (50° 13′ N., 7° 20′ E.), river, Germany; joins Mosel at Moselkern.

ELVAS (38° 48′ N., 7° 7′ W.), town, Portugal. Pop. 14,000.

ELVIRA, SYNOD OF, held near Granada, Spain, in 305 or 306, attended by nineteen bp's; legislated on ecclesiastical discipline, morals, and ritual.

ELWOOD, a city of Indiana, in Madison co. It is on the Lake Erie and Western, and the Pittsburgh, Cincinnati, Chicago and St. Louis railroads. The city is important industrially and commercially. It has a large trade in live stock, grain and produce. Its industries include tinplate mills, iron works, canning factories, plate glass factories, etc. There is a public library. Pop. 1920, 10,790.

ELY (52° 23′ N., 0° 15′ E.), city, Cambridgeshire, England, in Isle of Ely, on Ouse; famous for beautiful cathedral founded XI. cent.; combines Saxon, Norman, and Gothic styles. Formerly there existed a convent, VII. cent., burned by Danes; and monastery IX. cent., taken by William the Conqueror. Manufactures—oil and earthenware. Pop. 1921, 7,690.

ELY, RICHARD THEODORE (1854), *b.* in Ripley, New York, April 13, 1854. Graduated from Columbia and studied at Halle, Heidelberg and Geneva. Professor of political economy Johns Hopkins 1881-1892, when he filled the same chair at the University of Wisconsin. Member of Baltimore Tax Commission 1885-1886; Maryland Tax Com.,1886-1888. Founded the American Bureau for Industrial Research. A founder of the American Economic Asso. 1885, of which he was secretary then president. First president of American Association for Labor Legislation, 1907-1908. Lectured at University of London, 1913. Among his publications are 'Taxation in American States and Cities', 'Outline of Economics' 1893; 'Monopolies and Trusts'; Socialism and Social Reform', 1894; 'Property and Contract in Their Relation to the Distribution of Wealth,' 1914. Edited Macmillan's 'Citizens Library of Economics' and 'Social Science Text Book.' 'The World War and Leadership in a Democracy,' 1918.

ELYOT, SIR THOMAS (*c.* 1490-1546), Eng. diplomatist and scholar; clerk of assize, 1511-28; wrote *The Governour* 1531; ambassador of Henry VIII. to Charles V.; friend of Thomas More; M.P. for Cambridge, 1542; much renowned as a scholar; pub. earliest large Latin dictionary 1538, also *The Castell of Health*, etc.

ELYRIA, a city of Ohio, in Lorain co., of which it is the county seat. It is on the Lake Shore and Michigan Southern and the Baltimore and Ohio railroads, and on the Black River. There are manufactures of automobiles, telephones, flour, canned goods, concrete blocks, iron pipe, steel products, etc. The city has a fine park, a library and a hospital. Pop. 1920, 20,474.

ELYSIUM (classical myth.), also called 'Elysian Fields,' the abode of the blessed after death; variously placed in the lower world, the Western confines of the earth, and the Isles of the Blest.

ELZEVIR, name of a family of famous Dutch printers who issued beautiful editions of the classics, etc. 1592-1681.

EMANCIPATION PROCLAMATION THE, a proclamation by Abraham Lincoln, January 1, 1863, declaring the freedom of slaves in all states (except some parts) which were in rebellion against the United States. It was intended avowedly as a war measure, and Lincoln claimed the right 'By virtue of the power, vested in me as commander-in-chief of the army and navy of the United States and as a fit and necessary measure for supressing the rebellion.' On September 22, 1862, he had issued a proclamation that 100 days hence (January 1, 1863) in states, or parts of states in rebellion the slaves would receive freedom and that the United States would maintain their freedom. To this Jefferson Davis replied with a proclamation ordering that captured Federal negro soldiers and officers should be turned over to the confederate states. As the proclamation of January 1st abolished slavery in those parts of the country not under the military power of the United States the Democrats said it had no legal force. But the proclamation produced a good effect politically. To back the Confederacy meant to endorse slavery instead of freedom, and while the administration lost some luke-warm Northern Republicans, the anti-slavery advocates in the United States, England and France became more united and stronger. The south knowing that defeat would mean the emancipation of the slaves thought late in the war that they might as well do it themselves. Lee and other leaders seriously considered freeing the slaves to fight in the Southern armies to preserve the independence of the Confederacy.

EMANUEL I. (1469-1521), king of Portugal; succ. John II. 1495; noted for religious enthusiasm, promotion of foreign trade, and zeal for exploration through Vasco da Gama and other discoverers.

EMBALMING, method of preserving dead bodies from corruption by means of aromatic and antiseptic preparations. The art was carried to a high state of perfection by the ancient Egyptians, and some of the bodies which have been thus preserved date back to 3600 B.C. The intestines were removed by means of an incision in the left side, the cavity filled with myrrh and cassia; the body afterwards being steeped for about seventy days in a preservative liquid, and subsequently swathed in gummed cloth.

EMBARGO, the detention by a State of vessels within its ports, or the prohibition of trade between certain ports.

EMBARGO ACT, an act recommended by President Thomas Jefferson and passed by Congress on December 22, 1807. It was inspired by the orders given by both France and England to their respective war ships to seize all neutral vessels trading with the other, those two countries being then at war. As American trade was largely with either France of England, American ships suffered severely. The Embargo Act sought to retaliate by forbidding American trade with France and England all together. No American vessel was allowed to sail for Europe and no European vessels were allowed to enter American ports. New York and the New England cities, being especially commercial centers, suffered most severely, and so strong was the dissatisfaction with the President's policy that even open secession was threatened by influental elements in New England. Pressure finally became so strong that Jefferson, after the Embargo had been in force fourteen months, consented to its repeal. It was followed by the Non-intercourse Act, which allowed trade with all countries but England and France. None of these peaceful measures proved effective, and only the force employed during the war of 1812 finally brought England to terms.

EMBASSY. (1) mission headed by ambassador. (2) residence of an ambassador.

EMBER DAYS, four periods set apart for fasting and prayer in the Christian Church, viz. Wednesday, Friday and Saturday after the 1st Sunday in Lent; after Whitsunday; after Sep. 14; and after Dec. 13.

EMBEZZLEMENT, crime by clerk or other employee who converts his master's money to his own use. It must be shown that the person charged was regularly employed in an official capacity.

EMBOLISM, a plug; a blocking of a blood vessel by a substance carried by the blood-stream from some other part of the circulation. The importance of this condition depends on the source of the plug and its nature, whether it contains infective bacilli, which will cause infective changes at the seat of the plug, or simply acts as a mechanical blocking of the circulation. Both of these are serious, for when the E. lodges in the brain, it may produce paralysis, either with a slow onset or a sudden one. Emboli are apt to occur in septic conditions, and are characteristic of pyaemia, a condition in which pus-forming germs are found in the blood. Sudden paralysis of the brain is known as apoplecy. The E. may originate from the heart, even in cases in which the victim is unaware of having any cardiac affection.

EMBOSSING, process of stamping under a press, or of beating out a relief pattern upon metal, leather, or other substance. It is distinguished from *stamping*, in which the lamina is pressed by a form into a mould, whereas the under surface in e. is a plane face of felt or other yielding material. *Repousse* work is the e. of thin metal by beating upon the reverse side.

EMBRACERY, legal term for the act of any person who intimidares or otehrwise attempts to influence a court or jury; punishable by fine and imprisonment.

EMBRASURE, door or window; also opening for cannon in battlements; a crenelle.

EMBROIDERY is the working of a needlework pattern upon a fabric with threads of silk, wool, metal, or other material. It is a method of ornamentation subsequent to the process of weaving, and is thus distinguishable from tapestry, where the weaving involves the creation of the pattern. It may be machine-worked, or a kind of art needlework done by hand. Examples of Egyptian embroidery date back to the 18th cent. B.C. The art was introduced to Europe from Byzantium, where magnificent work was produced, and it is amongst Eastern peoples that it is still most generally practised. In Europe the art flourished chiefly during the Middle Ages, when it was first employed in the working of heraldic devices, but subsequently it came into domestic use. Since the period of the Oxford movement there has been an increased use of embroidery for the decoration of ecclesiastical vestments, altar-cloths, etc.

The gold and silver thread used in embroidery and other forms of decoration has been manufactured from very early times. It is still very largely used in the ornamentation of military, naval, masonic, and other articles of dress. Gold thread ornaments are usually made of fine silver wire gilded and worked over a yellow cone of silk or cotton. In the making of silver decorations this cone is white. The cheaper kinds of gold and silver threads are made from alloys.

EMBRUN (44° 34′ N., 6° 29′ E.), town, Hautes-Alpes, France; has fine church, formerly cathedral. Pop. 4,000.

EMBRYO. See Embryology.

EMBRYOLOGY is the study of the beginning of a living thing, of its history during the period after it has commenced to germinate, and before it is born or has assumed the definite character of its kind. The study may deal simply with the structures of the young creature (*morphological embryology*), with the processes and conditions of embryonic growth (*physiological embryology*), embryonic development as it occurs naturally, or it may tamper with natural development in order to observe its ways and means (*experimental embryology*).

It was not until the 19th cent. that the minute researches on which the foundations of modern embryology are laid commenced with Prevost and Dumas's description of the earliest stages in germination, and von Baer 1792-1876 made his significant comparisons of different types of embryos. The resemblance between the very early stages of creatures so different as reptiles, birds, and mammals was emphasized, and was accounted for by the theory that the embryo traced in its own development the history of the race—that in the history of a single individual from the egg the story of the evolution of its kind from earliest times was summarized. The theory holds good only in a very general way, but it emphasized the importance of the study of early stages in unravelling the relationships of animals, and thus aided indirectly in the tracing of the genealogical tree of animals.

Later, the minuter aspects of embryonic life were investigated; the human ovum was discovered by von Baer in 1828; towards the middle of the century the function of spermatozoa and the fact that both sexual products were simple cells became gradually realized; and towards its close the fine dividing and counter-dividing of the nuclear mass, previous to fertilization and before cell-division, were made clear. To some thinkers it has seemed that the arranging and rearranging which takes place in cell division indicated a possible sifting of character into the resulting cells—a qualitative process which selected the potentialities of each developing unit. Such is the '*mosaic*' theory of Roux and Weismann. To others cell division is simply division and nothing more, a mere dividing up of quantities of protoplasm, the subsequent qualities of which depend upon their relationships to each other and to the organism as a whole.

As distinct are the two schools of mechanists and vitalists, the former holding that, did we but know all, we should be able to explain development wholly in terms of mere physics and chemistry; the latter arguing that there would still remain an unexplained residue which can be accounted for only by assuming that 'the principle of life', '*entelechy,*' or some such vital force, guides and controls the growth of things.

Embryology has revealed several important general truths. It has discovered that every organism, no matter what its final size, began as a single cell, which divided and redivided; that the division and redivisions of the primary cell or egg often follow the same plan, and result in a thimble-shaped mass of cells, two layers thick—the *gastrula*; and this simple structure was held in Haeckel's 'gastraea theory' to represent a supposed first-evolved many-celled animal, a gastraea—the ancestor of all animals other than Protozoa. The development of the two layers of the gastrula has been followed, and it has been found that in general each gives rise to a constant set of organs, so that even diverse-looking organs in different animals may have the same origin; and that the individual organs themselves are foreshadowed from an early stage. Lastly, as we have already mentioned, the early developments of animals have shed much light on the relationships of adult forms and of the animal kingdom as a whole, and experimental embryology has emphasized the fact that in nature a compensatory process, no matter what difficulties lie in its way, aims at the formation of a well-balanced, perfectly formed animal.

EMDEN, fort. seapt. town., Hanover, Germany (53° 22′ N., 7° 12′ E.); shipbuilding, herring fisheries; manufactures paper, ropes, woollens. Pop. 24,000.

EMDEN, German light cruiser, a famous commerce raider, was one of Admiral von Spee's Pacific squadron, and early in the Great War was detached to prey on Brit. commerce in the East. Having eluded the Jap. warships lying in wait for her by rigging up a fourth funnel and displaying the Brit. flag, she appeared in the Bay of Bengal early in Sept. 1914, and within a week had captured seven large merchantmen and cut off all sea communication between India and Burma. Afterwards her operations were extended to the Indian Ocean with equal success. The device of a dummy funnel was again resorted to to enable her to enter the harbour of Penang, where she torpedoed and sank the Russian cruiser *Jemtchug*, also sinking the Fr. destroyer *Mousquetaire* outside the harbour. On Nov. 9 she was caught and driven ashore on the Cocos Island by the Australian cruiser H.M.S. *Sydney*. During her brief career of two months *Emden* captured seventeen Brit. merchant vessels, values in the aggregate at $10,000,000. She was commanded by Capt. von Mueller, who died in Feb. 1923.

EMERALD, precious stone and rare mineral, of same family and composition as beryl, but differing in colour; harder than quartz, but one of softest precious stones; of beautiful green colour; found principally in Colombia, S. America; value depends upon deepness and beauty of colour.

EMERIC - DAVID, TOUSSAINT - BERNARD (1755-1839), Fr. archaeologist.

EMERITUS (adjective), retired; cf. Emeritus Prof. of Greek.

EMERSON, CHARLES FRANKLIN (1842). *B.* in Chelmsford, Mass. Received his Bachelor of Arts in 1868 and his Master of Arts in 1871 from Dartmouth College. From 1868 until 1874 was instructor of mathematics at New Hampshire College of Agriculture and Mechanical Arts. He was associate professor from 1872-1878 of Mathematics and Natural Philosophy. He instructed astronomy from 1878 until 1892. He was dean of the faculty from 1893 until 1913. On July 1, 1913 he became dean Emeritus. From 1915 until 1916 and from 1917 until 1918 he was a member of the House of Representatives of New Hampshire.

EMERSON, HARRINGTON (1853), efficiency engineer. *B.* in Trenton, N. J. Educated at Royal Bavarian Polytechnis 1872-1875, and Universities in Greece and Italy. Taught modern languages at Nebraska University 1876-1882. From 1882-1892 has been in banking and land business. Director of the Emerson Engineers, and was president of the Emerson Company 1900-1917. Examined mines in Mexico, United States and Canada as United States Representative of British Syndicate. Was one of the first to put in long distance Mail routes in Alaska 1898-1901. Reported on all known coal deposits of North American Western coasts. His efficiency methods on the Sante Fe system gained wide recognition. Was member of the Master Mechanics Association, American Railway Storekeepers Association. Author of the 'Twelve Principles of Efficiency'. On Herbert Hoover's Commission assigned to investigate and report on bituminous coal mining and railroads.

EMERSON, HAVEN (1874), *b.* in New York; educated at Harvard and

Columbia Colleges. Has been practising medicine in New York since 1899. 1902-1914 Associate in Physiology and medicine at College of Physicians and Surgeons. From 1906-1914 was assistant visiting physician of Bellevue Hospital. From 1915-1917 Commissioner of Department of Health, and president of Board of Health. Lecturer at Columbia College, and at University of Cornell was professor of Preventative Medicine. Served with the Medical Corps during the World War. Was decorated by the French Government and was Officer of Legion of Honor. Was a director of the Cleveland Hospital and Health Survey.

EMERSON, RALPH WALDO (1803-1882), American philosopher and poet. *B.* in Boston, May 25, 1903; *d.* at Concord, Mass. April 27, 1882. *S.* of Rev. William Emerson a Unitarian clergyman. He studied at the Boston Latin School and graduated at Harvard in 1821 (Overseer 1867-1879). At college he won second prize for composition and was class poet. For a short time he taught school in Boston and then studied for the ministry under Ellery Channing, and was later elected assistant, then sole minister of the Second Church (Unitarian), Boston. He resigned in 1832 owing to scruples against the administration of The Lord's Supper. He continued however to preach occasionally at other churches until 1847. Visiting Europe in 1833 he met Landor, Coleridge, and other noted men, including Carylyle whose lifelong friend he became, editing the American edition of 'Sartor Resartus'. On his return to America he located in Concord, Mass., where he prepared the lectures he delivered in Boston and vicinity. His tractate 'Nature' 1836 was hailed as an important work. His 'Concord Hymn' of same year and oration 'The American Scholar' increased his reputation. 'Essays' First Series appeared in 1841 and a Second Series in 1844. He helped found 'The Dial', organ of the New England transcendentalists, and succeeded Margaret Fuller as editor. His 'Poems' appeared in 1847, and in 1856 he lectured in England, publishing 'English Traits' on his return to America. A volume of essays 'Conduct of Life' appeared in 1860. 'May Day and Other Poems' 1867, and a prose work 'Society and Solitude' 1870; 'Parnassus', an anthology of English verse 1874, and a last volume of essays in 1875.

Like Carlyle Emerson was a pantheist, and he insisted on the identity of physical and moral law. Towards science his attitude was that of a poet and Platonist. He was a strong individualist. Whatever hindered the development of individuality he considered an evil.

EMERY, mineral, impure variety of corundum; colour, greyish black; dull and opaque; found in Asia Minor and Europe; best is obtained from Levant; being very hard, used for grinding glass and lenses; e. wheels used in engineering for grinding.

EMERY, HENRY CROSBY (1872), American economist. *B.* at Ellsworth, Me. December 21, 1872. Graduated from Bowdoin College in 1892 and studied at Harvard, and in Berlin. Instructor and professor of political economy at Bowdoin, 1894-1900; Professor of Political Economy at Yale, 1901-1909. Chairman of the U. S. Tariff Board, 1909, returning to Yale in 1913. Publications 'Speculation in the Stock and Produce Exchanges of the United States,' 1896. 'The Tariff Board and its Work' 1910 and 'Some Economic Aspects of the War', 1914.

EMETICS, substances given to produce vomiting, either by acting directly upon the stomach, or indirectly upon the brain centre in the medulla oblongata, which controls the act of vomiting.

EMEU OR EMU, a ratite bird in the family Dromaeidae. Like the cassoway, to which it is allied, it is common to Australia, but is being gradually destroyed. It stands about 5 or 6 ft. high and is second in size only to the ostrich. It differs from the cassoway in having a broad beak, no helmet, short feathers on the head and neck, and no wattles on the neck, no spines on the wing, and the claws of all three toes are almost equal to one another. The wings are rudimentary. but the powerful legs are well adapted for running, and are capable of giving dangerous kicks when the bird is roused. There are only two living species *Dromaeus Novae-Hollandiae,* the common E., and *D. irroratus,* the spotted E. Both are monogamous, and the male wholly or partially incubates the eggs. Their diet is strictly vegetarian, and both their flesh and eggs are eaten by natives.

EMIGRÉS, French citizens who left their country during Revolution; many settled in England; some joined foreign armies against France.

EMIGRATION. See Immigration.

EMILIA (44° 35′ N., 11° E.), division of Central Italy, extending nearly across peninsula; has Lombardy on W., Adriatic on E., Marches and Tuscany on S., Piedmont and Liguria on W.; includes provinces of Bologna, Ferrara, Modena, Piacenza, Ravenna, Reggionell' Emilia, Forli, Parma; area, *c.* 7900 sq. miles. Pop. 1915, 2,809,187.

EMIN PASHA, EDUARD SCHNITZER (1840-92), Ger. traveller; ed. at Ger. Univ's, medical officer at Antivari; went to Khartum, 1875, and served in missions under General Gordon; became gov. of Equatorial Province; murdered by Arabs in Congo Free State during unsuccessful expedition.

EMINENCE, honorary designation now only given to cardinals of the R. C. Church.

EMINENT DOMAIN, or 'compulsory purchase,' the State right to acquire private property for public use.

EMINESCU, MICHAIL (1849-89) Rumanian poet; great lyrist.

EMLYN, THOMAS (1663-1741), Eng. Unitarian theologian; imprisoned for writing *An Humble Inquiry into the Scripture Account of Jesus Christ.*

EMMANUEL ('God is with us'), name often applied to Jesus Christ.

EMMANUEL MOVEMENT. See AUTO-SUGGESTION; MENTAL HEALING.

EMMANUEL, PHILIBERT (1528-80). duke of Savoy; succ. his *f.*, Charles III., 1552. A strong Catholic, he tried to suppress his Prot. subjects, the Waldenses, but allowed them some liberty 1561.

EMMENDINGEN (48° 6′ N., 7° 51′ E.), town, Baden, Germany. Pop. 8,000.

EMMERICH (51° 51′ N., 6° 15′ E.), town, Rhine province, Germany; has large shipping trade. Pop. 13,000.

EMMET, ROBERT (1778-1803), Irish rebel; ed. Trinity Coll. Dublin; joined United Irishmen, and plotted with them on Continent; went to Dublin, 1802; planned Irish rebellion in July 1803. E. escaped, but later was arrested,(tried, and hanged, Sept. 20.

EMMET, THOMAS ADDIS (1764-1827), Irish lawyer and politician; *bro.* of Robert E., joined United Irishmen imprisoned, 1802; joined American bar; attorney-general of New York.

EMMICH, GENERAL OTTO VON (1848-1915), German officer. Educated at the Gymnasium School, Minden; began military life as a cadet, and joining the army became a lieutenant in 1872, captain 1880, brigadier-general 1905, lt.-general 1909, and General 1912. Though a capable officer, his principal claim to distinction in the World War 1914-1918 was that he led the vanguard of German troops into Belgium territory and thus invaded a neutral state. He was normally in command of the 10th Corps and on Monday, August 3, 1914, he led three divisions across the Belgian border. He commanded troops at Liege and in the battles of Mons, the Marne, and at Rheims under General von Buelow, and continued in active service until the close of the war.

EMMIUS, UBBO (1547-1625), Dutch geographer and historian; pub. *Rexum Frisicarum historiae decades* 1616, *Opus Chronologicum* 1619, *Historia temporis nostri*, etc.

EMMONS, NATHANIEL (1745-1840) Amer. divine; constructed a theological system sometimes called *Emmonsism*, somewhat differing from the Calvinism of his day.

EMOTION. See PSYCHOLOGY.

EMPEDOCLES OF AGRIGENTUM (probably *c.* 490-30 B.C.), democrat, philosopher, physician, and magician; exiled, he wandered through Gk. cities, preaching the ascetic life.

EMPEROR BUTTERFLY, APATURA IRIS, large Brit. butterfly, purple-colored, with white markings; lives oh decaying organic matter.

EMPEROR MOTH, SATURNIA CARPINI, large Brit. moth closely allied to *Bombycina*; male is orange-brow female grey; each wing of both sexes is marked with an eye-spot.

EMPHYSEMA, a condition of the lungs in which (*a*) the air-cells are over-distended, *vesicular* e., or (*b*) the air has infiltrated into the connective tissue between the air-cells and the pleura or membrane covering the lung, *interstitial* e.

EMPIRE, BRITISH. See BRITISH EMPIRE.

EMPIRE, THE HOLY ROMAN, came into being when on Christmas Day, 800, Pope Leo III. crowned Charlemagne (*q.v.*) emperor of the Romans in the Basilica of St. Peter's. Since 476 there has been no emperor in the West, which owned nominal allegiance to the Byzantine emperor at Constantinople. Charles the Frank, who had crossed the Alps to protect the Pope against the Lombards, was a fitting recipient of the Imperial title, for the memory of empire had never quite died away. The splendour and dignity of a Rom. emperor were now granted to a barbarian king, and the union of the two positions in one man was to have important results throughout the Middle Ages. After Charles's death 814 his vast dominions were subdivided, and the line of the Karlings came to an end with Charles the Fat in 888. During IX. cent. government had become anarchic and civilisation had deteriorated. Meanwhile the nationalities we call French and German were beginning to emerge, and an Empire like that of Charles the Great was now impossible. In Germany Henry the Fowler had consolidated a national kingship, and his s., Otto, was crowned emperor by the Pope in Rome in 962.

The Empire of Otto I. was more Ger. and less Rom. than that of Charles, and henceforward the Ger. kingship and the Imperial title (Holy Roman Emperor of the German People) were united. Otto's was a strong Empire. Otto II. 973-83 was a mystical enthusiast but his imitation of Byzantine splendour and his noble dreams were out of touch with the turbulence of his time. Otto III. died young and disappointed in 1002. In 1024 with Conrad II. began the strong dynasty of Franconian emperors, under whom the mediaeval Empire increased in power. But the Papacy, which had done so much to create the Holy Empire, came into conflict with it, and the end of the XI. cent. saw the humiliation of Henry IV. by Gregory VII. (Hildebrand). The climax of the struggle (which began with the Investiture contest) was reached under the Hohenstaufen dynasty, of which Frederick I., called Barbarossa 1152-89, was the most brilliant monarch. After the short reign of Henry VI. the strife continued under Frederick II., 1212-50.

The greatest days of the Empire were over, and in 1273 Rudolf I., the first of the House of Hapsburg, was elected. Germany became more and more split up among a mass of princes, great and small, and henceforth the monarch's real strength lay in his personal territories rather than in the Ger. kingship itself, which was now weaker than the national monarchies of France or England. The feudal nobles and princes of Germany now became practically supreme in their own dominions. The constitution of the Empire was defined by the *Golden Bull* of Charles IV. in 1356. 'He legalised anarchy and called it a constitution,' is Mr. Bryce's much disputed epigram. By degrees seven, a sacred number, came to be recognised as the number of the electoral college; the members were defined by the Golden Bull as the Abps' of Köln, Mainz, and Trier, the King of Bohemia, the Count Palatine, the Duke of Saxony, and the Margrave of Brandenburg (two others were added later). The practical independence of the Ger. princes was now legally recognised.

By the end of the Middle Ages the Empire had not only ceased to be more than Germany practically, but it no longer had a hold over men's minds. The Renaissance destroyed its mediaeval glamour; at the Reformation it was naturally committed to the Catholic side, and could claim less than ever to be universal. After the religious strife which culminated in the Thirty Years War had been ended by the peace of Westphalia, Prot. lawyers openly asserted the Empire was merely a Ger. monarchy. The Empire, however, dragged on a nominal existence for another cent. and a half; convulsions of the Fr. Revolution were the beginning of the end; in Napoleonic Europe it had no place; on Aug. 6, 1806, Francis Joseph (Francis II.) resigned the title of Elect Emperor of the Romans.

EMPIRICISM, doctrine that all truth is derived from immediate sense experience.

EMPLOYERS' ASSOCIATIONS, combinations of manufacturers employing labor, parallel to labor unions on the side of employers, organized to meet the demands of the latter. They may be divided into two classes; peaceful and hostile, though these two characters may be assumed alternately by the one organization at various times, as may be the case with a labor organization. The peaceful association of manufacturers is formed for the legitimate purpose of meeting the organized workers for collective bargaining, and the two may hold very friendly and even co-operative relations. The hostile association has for its purpose the repression of labor unions, and, as is also true of some labor organizations, employs the most unscrupulous methods to accomplish its objects. As has been proved by Government investigations, such hostile associations employ secret services of their own, their agents being members of labor organizations for the purpose of disrupting them or of bringing them into public disfavor by overt acts. During strikes, which such associations may sometimes cause by a policy of irritation, they employ armed terrorists to terrorize the active strikers. The first association of this kind in the United States was organized in 1875, as the U. S. Potters' Association, followed by the Stove Founders' Association, in 1886. The National Association of Manufacturers of the U. S., organized in 1905, is not on trade or industry lines, but general in character, and in 1922 had a membership of 6,000. This organization is at all times hostile, and is bitterly antagonistic to labor organizations. Aside from this there are many trade, or industry, associations, such as the Clothing Manufacturers' Association, which in 1921 locked out 60,000 workers in

New York and 15,000 in Boston and Baltimore.

EMPLOYERS' LIABILITY, OR WORKMEN'S COMPENSATION, legislation which has for its purpose the protection of employees against loss of earning power through injuries received in the industries, with special application to the responsibility of employers in reducing danger from injury to lowest minimum. In the early days of our present industrial system the theory was that employer and employee were bound only by a free contract, and if that did not specify compensation in case of injury, the responsibility was the employee's. Within recent years it is more and more being assumed that certain responsibilities are inherent in the employer's position, which must be enforced by the state, in the form of employers' liability, compulsory insurance, etc. Legislation with this tendency was first passed in the older industrial countries, notably in Germany, where it was initiated by Bismarck as a bulwark against the rise of Socialist sentiment. In this country such legislation is left to the separate states. The first law holding employers responsible in this regard was passed in New Jersey, in 1911. In 1921 all the states in the Union had followed this example except North Carolina, South Caroline, Florida, Arkansas and Mississippi. These state laws, naturally, differ somewhat widely in detail, especially regarding maximum and minimum payments to be made, occupations covered, periods during which medical aid must be rendered, while in some states occupational diseases are included and in others not. The employer usually covers his responsibility through an insurance company. The increase in this type of insurance on account of this class of legislation is shown by the following figures: in 1913 insurance companies in this country paid out $14,268,879 to injured employees, insured through their employers; in 1920 such payments amounted to $141,552,665, an eight-fold increase.

EMPOLI (43′ 43° N., 10° 57′ E.), town, Tuscany, Italy. Pop. 20,000.

EMPORIA, a city of Kansas, in Lyon co., of which it is the county seat. It is on the Atchison, Topeka and Santa Fe, and the Missouri, Kansas and Texas railroads, and on the Neosho and Cottonwood rivers. Emporia is the center of a large farming and stock raising region. It has also important industries, including foundries, woolen and flour mills, carriage factories, and canning factories. Its important public buildings include a courthouse and State Normal School. It is the seat of the College of Emporia. Pop. 1920, 11,273.

EMPSONSIR, RICHARD (*d.* 1510), Eng. statesman; associated with Edmund Dudley in a vigorous system of taxation under Henry VII.; charged with constructive treason by Henry VIII.,and beheaded.

EMPYEMA, collection of purulent fluid in the space between the outer and inner layer of the lining of the lung, or pleura, caused by infection by various organisms, usually after pleurisy, pneumonia, by the bursting of an abscess or a tuberculous cavity.

EMS (53° 23′ N., 6° 57′ E.), navigable river, Germany; enters North Sea by two mouths; connected with Rhine, Dortmund, and Emden by canals.

EMS (50° 20′ N., 7° 42′ E.), town, Hesse-Nassau, Germany; health-resort; thermal springs. Pop. 7,000.

EMSER, JEROME, OR HIERONYMUS (1477-1527), Ger. Catholic theologian; engaged in violent controversy with Luther and Zwingli; wrote *Annotationes* to Luthers' Ger. New Testament, and himself made a trans. from Vulgate.

EMULSIONS, liquid preparations containing fats, oils, resins, or waxes, reduced to a fine state of subdivision and diffused throughout a watery medium, the oily particles usually being kept apart by means of an emulsifying agent of a mucilaginous nature, such as gum, yolk of egg, Irish moss, mucilage of acacia, etc. Among the most popular are emulsions of cod-liver oil, castor oil, and petroleum.

ENAMEL is a vitreous substance or glass, colored if necessary by the admixture of earths or metallic oxides before fusion, used as a surface for porcelain or metal, for decorative or useful purposes. *Cloisonne* e. is applied to a surface divided into a pattern of compartments by fine partitions, each compartment containing a distinct colour; *champleve* e. is placed upon a hollowed ground, and is largely used in jewellery; *surface* e. forms a uniform coating like the white e. face of a clock.

ENARÉ, LAKE (spelt also Inara, Enari, Indiagher), a lake of Russian Lapland in the extreme N. of the prov. of Uleaborg. It is dotted with small islands and has the fishing village of Enare on its western shore.

ENAREA, a lofty plateau region of Abyssinia watered by the Gibbe R. Prin. town, Saka. Trade in coffee and ivory. Pop. 40,000.

ENCAUSTIC. (1) Name given to a method of painting in wax frequently employed by ancient Egyptians, Greeks, and Romans, but little used by moderns. (2) Name given to tiles of very close texture much used in mosaic pavements. The fine texture is secured by means of very heavy pressure before the tiles are dried and fired.

ENCEINTE (Fr.), term used in fortification for innermost line of defences; of a woman, pregnant.

ENCEPHALOCELE, a protrusion of a portion of the brain substance through an opening in the skull. It is more commonly a congenital condition; its importance depending upon its size and situation. It may be described as a visible tumor of the brain, in contradistinction to a cerebral tumour, which is understood as a growth inside the brain.

ENCKE, JOHANN FRANZ (1791-1865), a German astronomer, studied under Gauss at Göttingen. He served in the army from 1813-15. By 1822 he was director of the observatory of Seeberg, near Gotha. Through Bessel's influence he became secretary of the Academy of Science at Berlin, 1825. and director of the observatory there. He superintended the execution of the star-maps of Berlin Academy, 1830-59, and the erection of the new observatory, 1832-35. He is most famous for his discussion of the orbit of the comet discovered by Pons, 1819. It has since been known as E.'s comet, and has the shortest known period of about three and one-third years. E. also wrote *Die Entfernung der Sonne,* 1822-24 (two tracts based on the transits of Venus, 1761 and 1769). He edited the Berlin *Astronomisches Jahrbuch* from 1830, and issued four vols. of *Astronomishe Beobachtungen auf der Sternwarte zu Berlin,* 1840-56. See LIFE BY BRUHUS, 1869.

ENCLAVE, detached tract of one country or State enclosed by the territory of another; the detached portion is an *exclave* from the point of view of the country to which it belongs, an enclave from that of the surrounding country.

ENCYCLICAL, papal letter issued to public.

ENCYCLOPÆDIA, OR CYCLOPÆDIA, a work covering the entire circle of the arts and sciences; a comprehensive survey of human knowledge, or any particular branch of it, and usually arranged in alphabetical order. The earliest extant work of an encyclopaedic character is the *Natural History* of the 'elder' Pliny (A.D. 23-79), in which he treats of a great variety of subjects, including geography, med., astron., bot., fine arts, mineralogy, etc. Two famous encyclopaedias of the Middle Ages were the *Bibliotheca Mundi* of Vincent of Beauvais (1190-1264), and the comprehensive *Livres dou Tresor* of Brunetto Latini (1230-94), a Florentine, well known for his association with Dante. The *De Proprietatibus rerum,* written in Latin by Bartholomeus de Glanville, an Eng. Franciscan, was trans. by John Trevisa (1398), and met with much success. The name *cyclopaedia* was first used in connection with a work pub. at Basel by Ringelberg in 1541, and thereafter that, or *encyclopaedia,* became the general name for such works. Other famous early encyclopaedias were the compilations of Antonio Zara (1615); Johann Heinrich Alsted (1630); Louis Moréri's *Le Grand Dictionnaire Historique* (1674); Johann Jacob Hofmann's *Lexicon Universale* (1677); Etienne Chauvin's *Lexicon Rationale* (1692); Pierre Bayle's *Dictionnaire Historique et Critique* (1697); and the *Biblioteca Universale,* by Vincenzo Maria Coronelli, an Ital. Franciscan (1650-1718), of which only 7 out of 40 vols. projected were published before his death.

The earliest Eng. enclyclopaedia of importance was the *Lexicon Technicum* 1704, compiled by the Rev. John Harris, secretary to the Royal Soc. This was followed by Ephriam Chambers's *Cyclopaedia, or Universal Dictionary of the Arts and Sciences* 1728, which met with immense success, succeeding editions being revised and enlarged by Abraham Rees and others. This work also served as the basis upon which Diderot and his associates built their famous *Encyclopedie* (33 vols. 1751-80).

The most famous of later publications of this kind is the *Encyclopaedia Britannica,* originally published by A. Bell and Colin MacFarquhar, or Edinburgh, with William Smellie as editor. It was first issued in sixpenny parts, the earliest appearing in Dec. 1768, and finally completed in 3 vols. in 1771. A second ed.—the first including historical and biographical articles—was issued in 10 vols. in 1784, a third ed., in 18 vols., appearing in 1797; also numerous editions since, through various firms. The *Edinburgh Encyclopaedia,* ed. by Sir David Brewster, in 18 vols., was issued 1810-30; the *Penny Cyclopaedia,* ed. by Charles Knight, 29 vols. 1833-46; the *English Encyclopaedia,* 23 vols. 1853-61) *Chambers's Encyclopaedia,* 10 vols. 1860-68 (several revised editions since). Besides the works named there are innumerable publications of an encyclopaedic character upon a great variety of subjects.

Amongst foreign encyclopaedias may be named, in French, Larousse's *Le Grand Dictionnaire Universel* (15 vols.), *La Grande Encyclopedie* (31 vols.), and *Petit Larousse Illustre* (1 vol.); in German, Meyer's *Konversations-Lexicon*, and Gruber's *Allgemeine Encyklopadie*. (Important Amer. works are *The New International Encyclopaedia*, Nelson's *Perpetual Loose Leaf Encyclopaedia* and the *Americana*).

ENDEMIC, a disease affecting a community which is caused by local conditions. This distinguishes it from an epidemic, which is a disease brought to a community from a distance. An epidemic, such as small-pox, tends to pass on, whereas an E. disease, like malaria, tends to remain.

ENDERBY LAND (67° 21′ S., 49° 40′ E.), district, in Antarctic, discovered by Captain John Briscoe, 1831; he named it after his master, Samuel Enderby, grandfather of General Gordon.

ENDICOTT, JOHN (1589-1665), *b.* at Dorchester. He went to America in 1628, where he became manager of the plantation of Naumkeag (Salem). Two years later he gave place to John Winthrop and headed several expeditions against the Indians. From 1641-44 he held respectively the position of deputy-governor and governor of Massachusetts, and *d.* at Boston, March 15. E., though a brave and benevolent man, was of an austere Puritan disposition.

ENDIVE (*Cichorium Endivia*), plant of order Compositae; cultivated as vegetable; resembles Chicory (*q.v.*).

ENDOCARDITIS. See HEART.

ENDOGAMY, marriage only within a particular clan or community; found in primitive races; obtains in parts of Central America, Africa, India; some races in India are compelled to marry in the tribe but the wife must not belong to the husband's clan; a Hottentot generally marries in his own kraal.

ENDOGENS, name given by Lindley to monocotyledons on incorrect assumption that growth of stem came from within (Gk. *endo*, within).

ENDOGENS, plants in which secondary wood is developed in bundles which are external to the primary bundles, and by this means growth in thickness of the stem and root takes place. The primary bundles contain no cambium layer, so the usual form of development of new wood cannot take place. Monocotyledons is the class of plants in which these socalled closed bundles occur, but only such members of the class as arbores cent Liliaceae, and Yucca, etc., are E.

ENDOMORPH, a mineral enclosed within another—the *Perimorph*.

ENDOR (32° 38′ N., 35° 25′ E.), ancient town, Palestine, where Saul visited witch on eve of battle of Gilboa.

ENDOSPERM. See SEEDS.

ENDYMION (classical myth.), beautiful shepherd youth who dwelt on Mount Latmus, and was beloved by Selene (Luna), queen of the night. He received from Zeus the gift of perpetual youth and the power of sleeping at will; subject of poem by Keats.

ENEMA, injection of fluid into rectum through the anus. E. may be (1) *Purgative*,—cold or lukewarm water containing soap, olive oil, castor oil, or salts; should be used seldom, as it distends the intestine; (2) *Nutrient*,—peptonised beef-tea, eggs, milk, etc.; given in case of stomach's inability to retain food, *e.g.* after surgical operation; (3) *Astringent*,—cold water containing zinc or copper sulphate, tannic acid; used for checking diarrhoea or internal haemorrhage; (4) *Healing*,—salt and water, laudanum, starch, silver nitrate; for haemorrhage of lower bowel; (5) *E. for worms*,—strong solution of common salt and water.

ENEMY, ALIEN, See ALIEN ENEMY.

ENERGICI, ENERGUMENS, the diseased or insane in the early Church, believed to be afflicted with evil spirits.

ENERGY is the capacity of a body or system to do work. For the purpose of measuring the quantity of work the system is capable of performing, the unit used is either a *foot-pound* (the work done in moving a pound weight through a vertical distance of one foot) or an *erg* (a gramme moved through a centimetre). The energy of a body may be due either (a) to its position, as in the case of a raised weight or a deformed spring, or (2) to the momentum it possesses when in motion. In the first the energy is *potential*; in the second, *kinetic*.

Energy may take different forms, and any one form may change into another. For example, the *radiant* energy from the sun stored in coal is changed into *chemical* energy in burning, which in turn is transformed into heat energy; this can be converted into *mechanical* energy, from which may be obtained *electrical* energy, and so on. During all these changes, however, no energy is destroyed, although a great deal is wasted. *Energy, like matter, is in-*

destructible. This principle is known as the Conservation of Energy. All the energy in the world is originally obtained from the sun. Another law is 'Whenever mechanical energy is converted into heat, or vice versa, the ratio of the mechanical energy to the heat is constant.' This ratio was first investigated by Joule, and is called Joule's Mechanical Equivalent of Heat. It is equal to 42,000,000 ergs.

Energetics. Quite early in the 19th cent. experimental investigation pointed to a direct connection between heat and mechanical energy. This resulted in the rejection of the caloric theory of heat, the formulation of the first law of thermodynamics, and the development of the study of energetics, the principles of which have helped to co-ordinate and explain pnehomena and causes previously considered far removed from each other.

Energy cannot be destroyed; it may undergo many changes, but the total energy in the universe must always remain the same. This summarizes the principles of Conservation and Transformation of Energy, applications of which, by mathematicians, to statical and dynamical problems have yielded important results.

In 1824 Carnot conceived the notion of a theoretically perfect heat engine in which a gas undergoes a reversible cycle of operations. A reversible cycle is one in which a substance after undergoing a series of operations is brought back to its initial state as regards volume and temperature, and is such that if the operations were reversed the results would be reversed. (Where friction enters as a factor in any operation, the cycle cannot be a reversible one.) Carnot's cycle consists of four operations: (1) Work is done *on* the substance, and its temperature is thus raised (substance undergoes an *adiabatic* compression) (2) Work is done *by* the substance but its temperature is not permitted to alter (*isothermal* expansion), heat being supplied by some source at the temperature to which the substance has been raised in the first operation. (3) Work is done *by* the substance, accompanied by a fall of temperature (*adiabatic* expansion). (4) Work is done *on* the substance until it regains its initial state, but its temperature is not permitted to alter (*isothermal* compression), heat being given out to some *sink*, called a condenser.

If the heat absorbed at the higher temperature during operation (2) is greater than that given out at the lower temperature during operation (4), the excess can be utilized to do external work. Consideration of Carnot's cycle, and deductions therefrom, form the basis of energetics and thermodynamics, and have resulted in the evolution of the modern heat engine.

Kelvin's Principle of Dissipation of Energy. Although energy cannot be destroyed, yet in every transformation a certain quantity appears as heat which is diffused and becomes unavailable for use. All natural phenomena are of such a kind as to tend towards this degradation of energy, and permanent equilibrium of any system will only be attained when the limit of minimum available energy has been reached. This principle has been very usefully applied to the problems of solution, fusion, solidification, osmosis, etc.; it provides an explanation of the phenomenon of chemical combination in definite proportions—combination only taking place if, as a result, the available energy is diminished —and it is the basis of the prediction thaj ultimately no energy will be available and the universe become a uniformly hot, inert mass.

ENFANTIN, BARTHELEMY PROSPER (1796-1864), Fr. social reformer; became follower of Saint-Simon; advocated communism, 'woman sufirage,' and other innovations; with others sent to prison for a year 1832 for offence against 'morality'; became railway director 1845; also a journalist and author.

ENFIDAVILLE (*c.* 36° N., 10° 20′ E.), town, Tunisia, N. Africa; produces cereals.

ENFIELD, a town of Connecticut, in Hartford co. It is on the New York, New Haven and Hartford Railroad, and on the Connecticut River. It is an important industrial center. It has carpet factories, brick works and plants for the making of filter presses, undertaker supplies, etc. It is also the center of a large tobacco growing industry. A settlement of the Shakers is within the town limits. There is a public library. Pop. 1920, 11,719.

ENFIELD (51° 40′ N., 0° 6′ W.) town, Middlesex, Eng.; small-arms factory. Pop. 1921, 60,743.

ENFILADE, military term meaning to rake with shot the full length of a line; in general, a raking fire.

ENGADINE (Upper, 46° 33′ N., 9° 55′ E.; Lower, 46° 48′ N., 10° 17′ E.), upper valley of Inn, in Grisons Canton, Switzerland, amidst Alps (Rhaetian group, etc.); divided into *Upper* E., towards S.W., with Lakes Sils, Silvaplana, and St. Moritz, and *Lower* E., towards N. W., with mineral springs at Schuls; length about 65 miles; elevation, 4000-6000 ft.; chief town, St. Moritz.

6070 ft.; Austrian possession, 1622-24; Swiss, 1652. Pop. Upper, 9,000; Lower, 8,000.

ENGELBERG (46° 49′ N., 8° 24′ E.), village, Switzerland; famous Benedictine monastery.

ENGELS, FREIDRICH (1820-95), a German Socialist, *b.* at Garmen. The *s.* of a wealthy cotton-spinner destined for a commercial career, he became interested in philosophical study, and during his year of military service in Berlin, frequented the society of the 'Freien' and wrote letters to the *Rheibische Neitung*. In 1842 he went to England and became connected with the Owenite and Chartist movements, writlater he went to Paris and there visited Karl Marx (*q.v.*). The two became close friends and worked so much together during the remainder of their lives that the works of the 9ne became more or less the works of the other. He published many books and articles, and wrote in collaboration with Marz, *Die heilige Familie oder Kritik der Kritischen Kritik* (Frankfort), 1845; and *Manifest der Kommunistischen Partei*, the famous communist manifesto (London, 1848; English ed, 1848 and 1888). After the death of his friend he published the third and last volumes of Marx's great work, *Das Kapital*, 1885. See Dr. Fr. Mehring. *Aus dem Literas schen Nachlass von Karl, Marx, Friedrich engels, und Ferdinand Lassalle* (Stuttgart), 1902.

ENGHIEN (50° 42′ N., 4° 2′ E.), town, Hamault, Belgium; lace and linen industries. Pop. 5,000.

ENGHIEN, LOUIS ANTOINE HENRI DE BOURBON CONDÉ. DUC D' (1772-1804), only *s.* of last Prince of Condé; left France at Revolution, and later served against France; seized in foreign territory by Napoleon's order, court-martialled on trumped-up charge and shot at Vincennes.

ENGINE, AUTOMOBILE. See Automobile.

ENGINEERING, a term originally applied to the construction and management of military machines and defences, later to the construction of canals, roads, and other public works, hence the term '*civil' engineer*. In its modern sense it is the art or skill to use natural sources of power for the use and convenience of man. With the multiplication of modern inventions the science divided itself into special branches. First came mechanical engineering, then in natural sequence mining engineering, naval architecture (marine engineering), sanitary engineering, electrical engineering, chemical engineering, electro-chemical engineering and aerial engineering.

ENGINEERING, CHEMICAL. See Chemical Engineering.

ENGINES. In the strict sense of the word an engine is an instrument which uses power to do work. More generally, however, the word is applied to all prime movers, machines of complex construction which produce mechanical effects by means of some motive power within the engine itself. The commonest types of prime movers are heat engines, comprising air, steam, oil, and gas engines. In the case of the steam engine the motive power is physical, being supplied by the expansion of the steam; in gas and oil engines the chemical energy of explosion is utilized. Steam engines are known as *external-combustion* engines, because in them the motive power is not produced in the cylinder but elsewhere in a boiler; gas and oil engines are called *internal-combustion* engines, because in them the power is developed in the cylinder where the explosion takes place. On account of the loss of heat between the furnace and the working fluid the thermal efficiency of external-combustion engines is relatively low. Engines are also classified according to their motion as *reciprocating* or *rotatory*. A reciprocating engine is one in which a to-and-fro motion is imparted to the piston which moves in the cylinder. When this motion is obtained by admitting the motive power to both sides of the piston alternately, the engine is *double-acting*; when the power is admitted only to one side of the piston and the return stroke is induced by condensation on that side and atmospheric pressure on the other, the appliance is a *single-acting engine*. If necessary, the to-and-fro action of the reciprocating engine is converted into rotatory motion by means of a crank. In the rotatory engine, rotatory motion is obtained directly, the piston itself moving round without a crank.

Air Engines are reciprocating engines, generally single-acting, in which the motive power is obtained by alternately heating and cooling a quantity of air within a closed vessel, part of which may form the motor cylinder. The expansion and contraction of the air as it is heated and cooled imparts a reciprocating motion to the piston exactly as in the steam engine. Like the steam engine, the air engine receives its heat from an external source, and is therefore an external-combustion engine. Though high temperatures may be used in the air engine without correspondingly high pressures being developed, the thermal efficiency is generally less than in an ordinary steam engine. There are also other disadvantages. Most air engines are bulky for their power; difficulty is experienced in heating satisfactorily large volumes of air; and that part of the containing vessel which is in immediate contact with the furnace is rapidly burned away. Their advantages are that they are easily worked, safe, and do not require skilled handling. For high-power purposes they have been superseded by the more economical and efficient internal-combustion types; but for low-power work, such as pumping in connection with the supply of water to hotels and country mansions, they are quite suitable and are freely used.

Gas Engines are internal-combustion engines whose motive power is obtained by the explosion of a mixture of gas and air. They possess two very marked advantages over steam engines. In the latter the fuel is consumed in a furnace outside the boiler, with much consequent loss of heat; while in the former the explosion takes place in the cylinder, and the fuel is also the working substance. More heat being thus turned into power, the thermal efficiency of the engine is higher. The gas engine requires much less attention than the steam engine. Once started, it may be left to run for hours if proper arrangements have been made for a continuous supply of gas and for automatic internal lubrication. The steam engine, on the other hand, calls for constant attention both to plant and to furnaces.

The history of the internal-combustion engine dates from 1823, when Brown invented an internal-combustion engine which propelled a boat on the Thames, drove a carriage, and worked a pump. Ten years later some improvements were effected on this model by Wright. But it was not till 1860 that the first commercially practicable gas engine, invented by Lenoir, was placed on the market. The great consumption of gas by this engine —about 100 cub. ft. per h.p. hour—led to its being soon discarded. A few years later Otto and Langen succeeded in reducing the consumption of gas by more than half—to about 40 cub. ft. per h.p. hour.

The important invention of a cycle of operations, made first by Roches and then independently by Otto, was followed by its application in 1876 to the Otto engine, which immediately took precedence of all earlier engines. The gas engines of to-day still employ the Otto cycle, and indeed follow closely the first models, though with many minor improvements. The complete cycle consists of four operations. During the first forward stroke of the piston, the *charging* stroke, gas and air are drawn into the cylinder. This explosive mixture is compressed in the return or *compression* stroke, the second stroke of the cycle. The charge is now exploded, and the piston is forced forward by the expansion of the gases, making the third or *working* stroke. In the next return or *exhaust* stroke the products of combustion are expelled into the air, and the cycle of operations is complete. The leading improvements that have been made since Dr. Otto's engine was put on the market include the introduction of water cooling, the adoption of electric ignition, and the employment of much greater compression, giving higher power and increased economy.

Oil Engines are internal-combustion engines whose action is based generally on the same principles as underlie gas engines, except that the motive power in their case is derived from oil. Petrol engines are the best known members of this class. The invention of the Otto gas engine in 1876 paved the way for the first oil engine, which was constructed shortly after that date. In 1883 Daimler built a light oil engine to run at speeds up to 1,000 revolutions per minute, and three years later applied it to a motor cycle, and in the following year to a self-propelled carriage. Since then the development of the oil engine has been so rapid as to bring about a virtual revolution in transport traffic within the present century, and incidentally to make possible the combination of lightness and power necessary for the aeroplane engine. A great new motor engineering industry has been created, and is extending with marvellous rapidity. An important landmark in development was the crossing of the Atlantic in 1912 by the first ocean-going vessel propelled by oil engines. This was *Selandia*, 7,400 tons, whose twin screws were each driven by an eight-cylinder motor of 1,250 i.h.p.; it attained an average speed of 10 knots per hour.

Except in the provision of apparatus for vaporizing the oil, most oil engines differ little in essentials from the gas engine, and are dependent, like it, on the Otto cycle of operations. Through a spraying nozzle the oil in the form of spray enters the vaporizer, a chamber heated externally either by a jacket through which the exhaust gases pass or by some other means. At the first stroke the air supply is drawn into the vaporizer and the charge enters the cylinder; here it is compressed at the second stroke; ignition and explosion now take place, and the piston is forced forward in the third stroke, doing work as it goes; on the fourth stroke the exhaust gases are expelled into the atmosphere, and the cycle of operations is complete.

Diesel Engines. Of oil engines not based upon the Otto cycle, the Diesel engine is perhaps the best known. In this engine air is admitted to the cylinder and subjected to a pressure of about 35 atmospheres. Under this compression its temp. rises rapidly. Oil is now injected at the end of the piston stroke, and owing to the high temp. of the compressed air at once burns away, but *without explosion.* The oil supply is now cut off, and prolonged expansion takes place, until release occurs on exhaust at the end of the stroke. See DIESEL ENGINE.

Steam Engine.—The essential principle in all types of steam engine is that they convert the energy stored up in steam into mechanical work. As early as 120 B. C., Hero of Alexandria employed steam to drive a kind of steam turbine; but practically no further progress was made for upwards of seventeen centuries. In 1629 Branca, an Italian, caused a wheel to rotate by means of a jet of steam impinging on vanes set on its rim. This was merely a scientific toy. Denis Papin 1690 invented the steam cylinder and piston, raising the piston by steam and then condensing the steam to form a vacuum. The first practical steam engine was made by Savery, for pumping purposes, in1698. It consisted of two egg-shaped vessels which could be connected alternately with a boiler and a well. Steam was admitted to one of the vessels, and, communication with the boiler having been shut off, was condensed there by the cooling action of a jet of water on the outside. A partial vacuum was thus formed, and water from the well was forced up the pipe by atmospheric pressure. The vessels acted alternately, one emptying while the other filled.

The first practical piston engine was designed by Newcomen, Savery and Cawley 1705. The piston was connected with one end of an overhead rocking beam, the other end of which carried a long pump rod and a heavy weight or counterpoise to bring the piston to the top of its stroke when steam was admitted into the cylinder. That point of the stroke having been reached, the steam was shut off and condensed in the cylinder by a jet of cold water so as to form a partial vacuum under the piston, which was then forced down by atmospheric pressure.

The epoch-making inventions, patented between 1763 and 1769, by James Watt of Glasgow, revolutionized the steam engine, and are the basis of the perfect machines of to-day. Watt's improvements were based on the following important principles; first, that the cylinder should be kept as warm as possible to prevent undue loss of steam; second, that condensation should therefore take place in a vessel separate from the cylinder; third, that the steam should be used expansively to press on the piston in the cylinder; and fourth, that the piston and other parts should be made air and water tight, for which purpose he employed oil, animal fats, etc. The high-pressure engine is due to Trevithick, whose 'Cornish' engine was provided with a single cylinder and condenser and used the steam expansively.

The principle of the *compound engine,* first patented by Hornblower 1782, is a most important one, and its adoption marked a signal advance. It depends upon the fact that the economical working of an engine is greatly augmented by using steam at a high initial pressure and allowing it to expand gradually to a low final pressure. If all the expansion take place in one cylinder, there is a wide variation of temp. internally, and part of the entering steam is condensed without doing any work. By dividing the expansion into two or more stages carried out in two or more cylinders, the compound engine reduces the waste of steam due to condensation in the cylinder. Practically all modern engines are designed on the compound system, with the initial and the final expansions taking place in the 'high-pressure' and the 'low-pressure' cylinders respectively. Triple-expansion engines have an intermediate cylinder between these two.

Hornblower's first compound engine was not commercially successful owing to patent difficulties. But the principle was revived later for marine purposes. In 1802 Symington, a Scot. engineer, ran the first steamer, the *Charlotte Dundas,* on the Forth and Clyde Canal; the *Clermont* was produced in 1807 by Fulton (See ROBERT FULTON), an American, and engined by Boulton and Watt; and the *Comet,* built on the Clyde by Henry Bell in 1812, was so successful as practically to solve the problem of the application of steam to the propulsion of ships, while in 1829 the achievements of Stephenson's *Rocket* ensured the adoption of locomotive traction on land.

Thermodynamics of the Steam Engine.—In the steam engine, as in nearly every other type of heat engine, the expansion of an elastic fluid is utilized to do work, generally by acting on a piston which moves in a cylinder. The essentials in this action are three in number—viz., a working fluid, a source of heat, and a receptacle for unused heat. The working fluid is the steam, the source of heat the furnace, and the receptacle for unused heat the condenser. Heat is supplied to the cold water in the boiler; the water is converted into steam, passes into the cylinder, expands, pushing the piston before it and becoming cooler, and is expelled into the condenser to be condensed into water again. Of the heat originally imparted to the steam, part is lost by conduction through the walls of the cylinder, part is carried into the condenser, and part disappears. This last portion is the part of the heat which has been employed to do work on the piston, and the work done in moving the piston through its outward stroke is the exact mechanical equivalent of the heat lost. The ratio of the heat so utilized to the total quantity of heat originally supplied to the steam is the measure of the *thermal efficiency* of the engine; in other words, the more heat used to drive the piston and the less heat conducted through the walls of the cylinder and expelled to the condenser the more efficient is the engine. In practice there is always a certain amount of heat unavoidably lost owing to the friction of the mechanical parts. The most important cause of wasteful loss of heat, however, is condensation in the cylinder; and this is now largely reduced by using superheated steam at a high temp. and pressure.

Important Engineering Definitions.—Energy is capacity for doing work; work is done when a force acts through a distance overcoming resistance. The unit of work is the foot-pound—*i.e.*, the amount of work done in raising a mass of 1 lb. to a height of 1 foot against gravity; or more generally, the amount of energy expended when a force of 1 lb. acts through a distance of 1 foot. The power or activity of an agent is its rate of doing work. The unit of power is the horse-power: an engine has 1 h.p. when its rate of working is 550 ft.-lb. per second, or 33,000 ft.-lb. per minute. Heat, like electricity, is a form of energy; and the unit of heat is the quantity required to raise the temp. of 1 lb. of water through 1° F. Heat energy may be transformed into mechanical energy, and conversely. It is found that for every unit of heat, so transformed 774 ft.-lb. of mechanical energy are produced; this quantity, first ascertained experimentally by Joule, is known as the *mechanical equivalent of heat.* The power of an engine is sometimes expressed as indicated h.p., some times as brake h.p. The i.h.p. is the full power which the engine should develop in view of the pressure on the piston. But a considerable portion oft this power, amounting to from 5 to 20 per cent. of the whole, is not available for external work, being used up internally in overcoming the frictional resistances of the mechanism. The power the engine can develop for external use is called the brake h.p., and is determined by fitting a brake on the fly-wheel and measuring the energy absorbed by it. The ratio of b.h.p.to i.h.p.in any particular case is the measure of the *mechanical efficiency* of the engine.

Stationary Engines are used to supply power to machines in factories power stations, workshops, etc. They are almost always of the direct-acting type, and may be simple, compound, or triple-expansion according to the work they have to do.

See TURBINES, also LOCOMOTIVES and MARINE ENGINES.

ENGLAND, with the addition of Wales, is the S. part of Great Britain (49° 57′-55° 48′ N., 5° 42′ W.-1° 43′ E.). The area of England is 50,874 sq. m.; the greatest length (from Berwick to Lizard Point) is 420 m., the greatest breadth (Lowestoft Ness to Land's End), 360 m. The coast line is *c.* 1,800 m. It is separated from Scotland by natural boundaries, the Liddel Water, Kershope Burn, Cheviot Hills (highest point, 2,422 ft.), and the Tweed, although until 16th cent. there was a strip of 'Debatable Land' between the Esk and the Sark. The Severn used to form part of boundary of Wales, but this has long been constituted by the Eng. counties of Cheshire, Shropshire, Herefordshire, and Monmouthshire.

Physical Features.—Deep bays on E. and W. coasts, with good harbours, cut into the country at nearly opposite points, making horizontal divisions sometimes almost peninsulas; thus Tynemouth faces Solway Firth, the wide mouth of the Tees Morecambe Bay, the Humber the mouth of the Mersey, which descends from same watershed as tributaries of the eastern stream; the Wash corresponds to Cardigan Bay, the Thames to the Bristol Channel, close to which it rises. The chief headlands on these coasts are: E., Flamborough Head and Spurn Head (Yorkshire), the slight projection of Lowestoft Ness—most E. point (Suffolk), the Naze (Essex), North Foreland and South Foreland (Kent); W., St. Bees Head (Cumberland), Hartland Point (Devonshire), Land's End (Cornwall). The S. coast runs, with tilt to N. E. in series of gentle bays, of which chief are Mount's Bay, Falmouth Harbour, Plymouth Sound, Lyme Bay (with Tor Bay), Weymouth Harbour, Poole Bay, and, between Hampshire and the Isle of Wight, the Solent and Spithead, with Southampton Water and Portsmouth Harbour (headquarters of Brit. fleet) running up into the land.

Islands are Holy Island and Farne Islands (off Northumberland), the Channel Islands, the Isle of Wight (Hampshire), the Scilly Isles (Cornwall), Lundy Isle (Devon), Walney (Lancashire), and Man (midway between England and Ireland); the Channel Islands and Isle of Man do not form part of England.

England is divided as to its physical characteristics into two clearly distinct parts, by a line of hills known to geologists as the Oloitic Escarpment, running from the lower Tees S.W. to the Exe mouth; the N.W. portion thus formed is of older geological character than rest of country, and contains its mountain systems, of Palaeozoic rocks with coal measures in the Carboniferous strata. The Old Rock systems may be divided into (1) the mountains of northern England, composed of (*a*) the Pennine Chain, the chief geological feature of the N., stretching S. from the N. boundary, the Cheviots. It attains chief height in Cross Fell (2,892 ft.), at meeting-place of the five northernmost counties; other heights in the chain are Whernside, Ingleborough, and Penygant, and its southern culmination, the Peak, Derbyshire; (*b*) the Cumbrian mountains of the Lake District, where Scaw Fell (3,210 ft.), Skiddaw, and Helvellyn are the highest summits. They extend into N. Lancashire (Pendle Hill, 1,831 ft.). The chief lakes are Windermere, Ullswater, Derwentwater, Buttermere, Coniston, and Thirlmere. (2) The Welsh or Cambrian mountains. (3) The S.W. mountains, comprising (*a*) the high tablelands of Exmoor and Dartmoor in Somerset, Devon and Cornwall, with chief heights at Dunkery Beacon (1,770 ft.), Yes Tor (2,050 ft.), and Brown Willy (1,370 ft.); (*b*) the Mendip Hills, Somerset; (*c*) the Malvern Hills, Worcestershire, rising to 1,395 ft. at Worcester Beacon; (*d*) the Clee Hills and Wrekin, Shropshire. The newer S. E. portion of England may be divided into the Chalk Ridge and the Roe-Stone Ridge. The Roe-Stone Ridge commences to the S. of the Oolitic Escarpment, in the moors of Cleveland, Yorkshire, forms the Lincoln Heights, Edge Hill (Warwickshire), the Cotswolds (Gloucestershire), the Western Downs (Dorset(, and the Blackdown Hills (Devon). The Chalk Ridge runs S. from the bold chalk cliffs of Flamborough as the Wolds of the E. Riding of Yorkshire and of Lincolnshire, the E. Anglian Heights, the Chiltern Hills, the Marlborough Downs, and ends with the tableland of Salisbury Plains, from which the North and South Downs extend E. to Dover Cliffs and Beachy Head respectively, and form district known as the Weald. The highest point of this S. E. moiety of England, which belongs geologically to the Great Plain of Europe, is 1,489 ft., in N. E. Yorkshire.

A system of plains unites all parts of E., and has enabled roads, railways, and canals to be readily constructed. The chief plains are the Midland Plain, which divides the older from the newer rocks, the Plain of Lancashire and Cheshire, the Vale of York, and the Eastern Plain. The Fens are a marshy district round the Wash; many of its towns, like Ely, were islands in Saxon times. Above the chalk there stretches from Thames along E. coast to N. of Norfolk a tract of clay known as the London Basin, and round Portsmouth another tract known as the Hampshire Basin. From the Pennine Range the Tyne, Wear, Tees, Ouse, most of its tributaries, Trent and Witham, flow from E. slopes of Pennines into North Sea; the Lune, Ribble, and Mersey from W. slopes into Irish Sea. The two longest rivers of England are the Severn (200 m.), which receives the Teme, Avon, and Wye, and flows into the Bristol Channel, and the Thames (210 m.), which rises in the Cotswolds and flows E. to the North Sea, receiving (left) the Cherwell, Thame, Colne, Lea, and Roding, and (right) the Kennet, Wey, Mole, Darent, and Medway. The streams which enter the Eng. Channel from the S. coast are all short.

Climate.—The climate of England is of the most favourable type. It is not so mild and genial as to put a premium on idleness, nor is it so severe as to prevent out-of-door work at any season. The winters are exceptionally mild, and navigation is seldom impeded by ice. Rainfall is abundant, and provides ample water for crops and a plentiful supply of good water for the needs of large cities. Westerly winds with their warmth and moisture and the physical aspect of the country cause the western portions to have a higher (and less extreme) temperature and greater humidity than the eastern parts.

Counties.—The forty old counties of England are: 1. (N.) Northumberland, Cumberland, Westmorland, Durham, Yorkshire, Lancashire; 2. (Midland) Derbyshire, Northamptonshire, Nottinghamshire, Staffordshire, Leicestershire, Rutlandshire, Warwickshire, Worcestershire, Oxfordshire, Buckinghamshire, Bedfordshire, Hertfordshire, Middlesex; 3. (W.) Cheshire, Shropshire, Herefordshire, Monmouthshire, Gloucestershire; 4. (E.) Lincolnshire, Norfolk, Cambridgeshire, Huntingdonshire, Suffolk, Essex; 5. (S. E.) Kent, Sussex, Surrey, Berkshire, Hampshire; 6. (S.W.) Dorsetshire, Devonshire, Cornwall, Wiltshire, Somersetshire. Under the Local Government Act of 1888, the number of the 'Administrative Counties' was raised to 50.

Communications.—The total mileage of railways in England and Wales exceeds 16,000. The chief lines are the London and North-Western, the Midland, and the Great Northern, which run from London to Scotland; other lines include the Great Eastern, Great Western, Great Central, London, Brighton, and South Coast, South-Eastern, Chatham, and Dover. London has an elaborate system of underground railways. There are 3,461 m. of canals. There are about 151,000 m. of principal roads in England and Wales, kept in repair and improved partly by profit on motor spirit duties, carriage licences, etc. Increased motor traffic has led to the laying down of many miles of roadway covered with a bituminous preparation calculated better to withstand wear and tear.

Resources and Industries.—England owes its pre-eminence in Europe, only dating from middle of 18th cent., to coal, which has enormously facilitated the working of its other mineral treasures (chiefly iron and stone), and its manufactures. The coalfields, except for two small outbreaks in the Midland Plain, belong to the geological system of the N. and W. That of Northumberland and Durham, at the mouth of the Tyne, which has made Newcastle, Gateshead, Sunderland, Hartlepool, etc., busy commercial centres, was already worked in the 13th cent.; in this district, iron, steel, chemicals, machinery, and ships are manufactured. The Cumberland Field, between Maryport and Whitehaven, exports coal and limestone, produces iron and steel, and carries on shipbuilding at Barrow-in-Furness. The moorland villages of West Riding of Yorkshire have become thickly populated, thriving manufacturing towns; weaving always flourished in this grazing district, and now the Lancashire and Yorkshire Railway brings further wool, linen, and cotton material from Liverpool. The chief towns are Leeds, which possesses university, and cloth, iron, and machinery manufactures; the clothing towns of Bradford, Halifax, Huddersfield, Keighley, etc.; and Sheffield, with its cutlery industry.

The S. Lancashire coalfield has turned Manchester in a century from a large but agreeable manufacturing town to the growing commercial centre of the most densely populated district in the world.

The coalfields of N. and S. Staffordshire lie respectively in the Potteries and the Black Country. The Potteries import china-clay from Cornwall and flint from Kent and Sussex, and their 'Five Towns,' Burslem, Hanley, Langton, Newcastle-under-Lyme, and Stokes, are chief seat of Eng. earthenware industry. The Black Country, in the heart of the Midlands, has both coal and iron ore. Its chief towns are Birmingham, which manufactures hardware of all kinds for all parts of the world, Wednesbury (hardware), Wolverhampton (locks), Dudley (nails), Redditch (needles), Coventry (bicycles and motor cars). The coalfields of the Forest of Dean, Gloucestershire, and of Bristol have decayed in importance since working of richest Brit. field, that of S. Wales; and the ancient port of Bristol has been superseded to a large extent by Newport and Cardiff, on opposite bank of Severn.

After coal, iron is the most important mineral product; it is often found near the coal, but besides N. Lancashire and N. Staffordshire it is largely obtained in the Cleveland district of Yorkshire, and in Lincolnshire, Northamptonshire, and Leicestershire. Middlesbrough, since the discovery of the peculiarly valuable iron ore of Cleveland (*c.* 1840), has developed from a fishing village into a town of over 119,000 inhabitants, nearly all maintained by industries connected with the great iron and steel works which crowd the district with furnaces. Lincolnshire, Northamptonshire, and Leicestershire are less important for iron; Leicester itself has hosiery as principal industry; Northampton, boots and shoes. Lincolnshire, besides its cathedral city, once a Roman town, on the Wytham, possesses Boston, on the Wash, formerly an important port but now silted up, and the large fishing centre of Grimsby on the Humber. Other important minerals are tin (Cornwall), lead (Durham, Yorkshire, Cumberland, Westmorland, Derby, and Shropshire), copper (Cornwall and Devon), gypsum (Cumberland, Nottinghamshire, Staffordshire, Sussex, and Derby), stone (worked in most parts of the country).

Besides the hilly grazing grounds of the country there remain considerable tracts for agriculture. Lincoln, Leicester, and the N. and S. Downs are famous for sheep, Yorkshire and E. counties for horses; wheat is chiefly grown in S.E. counties, barley in E. and Midlands, oats in N., N. Midlands, W., and S. W., rye in inferior ground everywhere. Hops grow in S., especially Kent, and also in Herefordshire. Fruit, grown widely, abounds in Kent, Herefordshire, and S.W. generally; cider is made in Somerset, Devon, etc.

The old towns of the E. coast, Tynemouth, Hartlepool, Middlesbrough, Whitby, Scarborough, Bridlington, Hull, Grimsby, Boston, Yarmouth, Lowestoft, and Harwich all prospered either on wool trade with Netherlands or on the fisheries; herring and other fish used to visit this coast in far greater shoals than at present, and the fisher folk cruise out along the Dogger Bank (36 m. from Flamborough Head) in the summer for the cod fishery. Mackerel and pilchards are caught on S. and W. coasts. Fishing employs about 40,000 men and boys. London has from prehistoric times enjoyed international trade, and is the commercial centre of the world.

Population.—In 1921 the population of England was 35,678,530; previous censuses—34,045,290, 1911; 30,813,043, 1901; 24,614,001, 1881; 16,921,972, 1851; 11,281,957, 1821. By the 1921 census it was shown that in England and Wales there were 19,803,022 females and 18,082,220 males. For local Government, see art. under that head.

History.—A skeleton found at *Galley Hill*, near Northfleet, Kent in 1895, has been ascribed to a man of Central Asian race of the Early Stone Age, and stone implements of the remote Eolithic, Palaeolithic and Neolithic periods are abundantly found throughout England. The Neolithic period is held to have merged into the Bronze Age about 2,000 to 1500 B.C., and a date between these years has been given to *Stonehenge.* Stonehenge (10 m. N. of Salisbury, Wiltshire) consists of two circles of menhirs (the largest monolith being 22½ feet in height), only 16 remaining in position in the outer circle, while two of the five triple sets are still in position in the inner circle. The use for which the temple or monument was erected is the subject of many conjectures.

In the latter part ofthe Bronze Age the *Goidels*, a people of Celtic race, and in the Iron Age another Celtic race of *Brythons*, invaded the country and brought with them Celtic civilization and dialects, place names in England bearing witness to the spread of the invasion over the whole kingdom.

Julius Caesar raided Britain in 55 B.C. and 54 B.C., and in 43 A.D. the conquest of the country was undertaken by the Roman Emperor Claudius, who sent Aulus Plautius with a well-equipped army of 40,000 men, and himself visited Colchester (Camulodunum) and Londinium. The British leader from 48-51 A.D. was *Caractacus* (strictly Caratácus), who was finally captured and sent to Rome. By 70 A.D. the conquest of South Britain was completed, a great revolt under *Boadicea* (strictly Boudicca), Queen of the Iceni (Norfolk), beiug crushed in 61 A.D. In 122 A.D. the Emperor Hadrian visited Britain and built a continuous rampart, known as *Hadrian's Wall*, from Wallsend to Bowness (Tyne to Solway), remains of which are still traceable. The Romans administered Britain as a Province under a Governor, with a well defined system of local government, each Roman municipality ruling itself and the surrounding territory. Colchester, Lincoln, York, Gloucester and St. Albans stand on the sites of five Roman municipalities, while London was the centre of the road system and the seat of the financial officials of the Province of Britain. A well preserved Roman town of about 100 acres was first uncovered in the 18th century at *Silchester* (Calleva Atrebatum), 10 miles S. of Reading, and since 1890 the whole site has been investigated. Four main groups of roads radiated from London, and a fifth (the Fosse) ran obliquely from Ermine Street (at Lincoln), through Leicester, Cirencester and Bath to Exeter. Of the four groups radiating from London one ran S.E. to Canterbury and the coast of Kent, a second to Silchester and thence to parts of Western Britain and South Wales, a third (now known as *Watling Street*) ran through Verulamium (St. Albans) to Chester, with various branches and the fourth reached Colchester, Lincoln, York and the eastern counties. *Christianity* reached the Roman Province of Britain from Gaul in the 3rd century (or possibly earlier), the Bishops of Londinium, Eboracum (York), and Lindum (Lincoln) attending the Council of Arles in 314. The Roman garrison of Britain was much harassed in the 4th century by Saxon pirates, who invaded the eastern counties from the Wash to Spithead, while about 350 A.D. incursions in the north of Irish (Scoti) and Picts became most formidable, and towards the end of the century many troops were removed from Britain for service in other parts of the Roman Empire. Early in the 5th century Gaul was taken from the Romans by Teutonic invaders, and Britain was cut off from Rome; officials were no longer sent to the island, the garrison was left to defend itself, and appears to have been driven inland by the Northern and Saxon invaders, and to have been conquered and absorbed by the Celtic inhabitants, whose language and customs re-emerged.

The Celtic Britons appear to have called in the Saxons to resist the raids of the Picts and Scots and eventually the *English* (Angles, Saxons and Jutes) drove the Britons into the mountain fastnesses of the West (Strathclyde, Wales and Cornwall), the name of *Welch* (old English *Waelisc*— Foreign) being given to the islanders by the invaders from the continent. The area thus conquered was divided into several kingdoms, of which the chief were Northumbria (Bernicia and Deira), Mercia

(Middle Angles), and Wessex. The heathen Angli (whose gods Ti, Woden, Thunor and Frigg are commemorated in 'Tuesday Wednesday, Thursday and Friday') were converted to Christianity by a mission under Augustine (dispatched by Pope Gregory in 597), which established Archbishoprics at Canterbury and York, and the whole of England appears to have been converted by the end of the 7th century. In the 8th century Offa, King of Mercia, is stated to have built a wall and rampart, afterwards known as *Offs'a Dike*, from the mouth of the Dee to that of the Wye, as a protection against the Welch. The greatest of the English kingdoms was *Wessex*, with its capital at Winchester, and the greatest of the Wessex kings was *Alfred the Great* (871-901, who resisted the incursions of the Northmen (Danes) and fixed a limit to their advance by the Treaty of Wedmore 878. In the 10th century the Kings of Wessex recovered the whole of England from theDanes, but subsequent rulers were unable to resist the invaders, and England paid tribute (*Danegelt*) for many years, and was ruled by Danish Kings from 1016 to 1042, when Edward the Confessor was recalled from exile. In 1066 Harold (brother-in-law of Edward and *s.* of Earl Godwin of Wessex) was chosen King of England, but after defeating a Northumbrian revolt under his brother Tostig (aided by an invading army of Harold Hadraada of Norway) at Stamford Bridge in Yorkshire (Sept. 25), he was himself defeated at the *Battle of Hastings* (or *Sautlache*) on Oct. 14, 1066 and the Norman Conquest secured the throne of England forDuke William of Normandy. Since the *Norman Conquest* all attempts to invade England have been defeated.

The Norman Conquest was the beginning of the final process in the welding of the English nation into one compact body. The end was still a long way off. William brought in his train numberless Normans, all of whom had to be rewarded by the king with Saxon lands. The Saxons, therefore, sank to the bottom of the social scale, and for long there was no attempt made at the fusion of the races. William was occupied for long with the completion of the conquest of England, and when this had been done he turned his attention to the government of the country. He ruled with a hand of iron, but the heaviness of his hand was felt by Norman noble and Saxon serf alike. The fusion of Norman and Saxon would have come at a much earlier period had it not been for the possession of Normandy by the English kings. This naturally retarded the process. When William died a dispute arose concerning the succession, but Normandy had been left to Robert (the eldest son), and England to William Rufus. Constant quarrelling took place, and finally Robert handed over Normandy to William as a pledge for a sufficient sum of money to go on crusade, and a promise that whichever of the two died first the survivor should succeed to both dominions (England and Normandy). Unfortunately, during Robert's absence, William died, and the throne was seized by Henry I. 1100. In 1101 Robert returned from crusading and invaded England, but was repulsed, and in 1106 Henry crossed over to Normandy and defeated and took prisoner Robert at the battle of Tenchebrai. During the rest of his life Robert remained the forced guest of his brother. Henry I. was the first of the Norman kings to encourage the fusion of the races, he himself married to ensure the popularity of his house. He ruled sternly but wisely, and the wisdom of his policy was seen in the help which he received from his Saxon subjects in putting down the revolt of the barons of the W. In 1120 his only son William was drowned in the wreck of the *White Ship*, and the greater part of the rest of Henry's life was taken up in the attempt to get his daughter Maud recognised as the heir to the throne. Previous to his death in 1135, Henry coerced the barons into promises to recognise Maud, but the barons disliked the idea of being ruled by a woman, and further dreaded the power which such recognition would give to the husband of Maud, Goeffrey of Anjou. Finally, when Henry did die the barons elected as king Stephen of Blois, whose only claims to the throne were that he was the grandson of William I., and that he was a brave but complaisant and easily pleased warrior. With the accession of Stephen, in 1135, we get the beginning of the Civil War, which waged practically during the whole of his reign, and which was to the barons a period during which they were able to exercise their power unchecked. The people, crushed between the forces of the king and of Queen Maud, also found themselves crushed by the barons even more terribly. Finally, in 1153, the Treaty of Wallingford was signed by Stephen and Henry FitzEmpress of Anjou. By the terms of this treaty, Stephen was to reign until his death, when he was to be succeeded by Henry II. Henry II. was one of the greatest kings who ever occupied the throne of England. He ruled not only England, but Normandy, Maine, Anjou, Touraine, and Aquitaine. He was acknowledged overlord of Scotland, Ireland, and Wales; he practically ruled Brittany—in fact his dominions may be regarded as stretching from the Pyrenees to the Orkneys. He crushed the power of the baronage, and he determined to concentrate in the central authority, *i.e.* the crown, all power. He broke down the power of the barons, by judicious reforms he obtained the support of the people, but he failed when he attacked the Church. The point at which he had been aiming, the subordination of ecclesiastical law to the crown, failed when it had practically succeeded, by the murder of Becket in 1170. During his reign, Strongbow crossed over into Ireland and began the conquest of that country, although Henry himself had, at the beginning of his reign, determined on that course. The latter part of Henry II.'s reign was a failure, owing to his constant quarrels with his son. His eldest son had died practically fighting against him; Richard was a source of constant trouble, whilst John, the darling of his old age, was untrustworthy and Judas-like. The latter days of the king were passed in one long struggle with his arch enemy, Philip Augustus, and his sons, and in 1189, after being compelled to give in, he died with the words 'Shame on a conquered king' on his lips. He was succeeded by his son Richard, who, however, spent the greater part of his time out of England, either on crusade or in France. During the greater part of his reign his brother John plotted against him, attempting, finally, to keep Richard in captivity in Austria. Even when the treachery of John was obvious to Richard, it was forgiven. In 1199 Richard died, and was succeeded by his brother John. That the succession question was still in a state of chaos is obvious from an examination of the successions during the Norman and early Angevin dynasties. In only one instance had the heir by right of primogeniture succeeded. John now succeeded to the throne which would have been occupied by Arthur. He was essentially a clever king; he has been described as the cleverest of all the Angevins, but his vices far outmatched his virtues. He had energy which he did not use, ability which he perverted, and intelligence which he used wrongly. The early years of his reitn were occupied in a struggle for the French possessions. For a long time it had been the unhidden ambition of Philip Augustus to win back those portions of France which were still held by the English. He had struggled against Henry II. and Richard I., but his opportunity came when John, unpopular throughout the whole of his dominions, succeeded. In 1204 the Chateau-Gaillard was lost, and Normandy passed into the hands of the French. John by no means gave up hope, and struggled constantly against the French, forming league after league. He, however, soon found himself in difficulties enough at home. In 1205 the barons refused to fight for the recovery of Normandy; in the following year, in spite of the violent opposition of John, Stephen Langton was appointed Archbishop of Canterbury. John refused to recognize him, and in 1208 England was laid under an interdict and later the king excommunicated. During this period John had alienated the sympathies of the barons and of the people. Gradually he saw himself beset on every side by dangers; France threatened, the barons negotiated, the Church thundered. He turned for support to the strongest power, and became the vassal of the pope. England was to be held in fee from the papacy. This was the final blow to the barons. Led by the Church, they banded themselves together under Stephen Langton, and resolved to force the king to issue a charter which would safeguard their liberties. After a great struggle John found that he must surrender, and at Runnymede, in 1215, he signed the Great Charter, intending to keep it as he had kept most other oaths. He attempted to punish the northern barons who had been chiefly responsible for the Charter, and they in turn invited the Dauphin to England as king. War was still raging in 1216 when John died, leaving the throne to his son, Henry III., aged nine. During the early part of the reign the chief difficulty was the Civil War. Through this dangerous period Henry was guided by William Marshall, Earl of Pembroke. The charters were confirmed, the baronage reconciled, and Louis, the Dauphin, finally left the country 1217. From 1217-32 the country was ruled well by William Marshall, and on his death by Hubert de Burgh. In 1223, began the personal rule of Henry III., a period which is noted for the domination of foreign favourites. Henry was a pious weakling, who had but little mind of his own, bur who could on occasion be extremely obstinate. In the same year 1264 civil war broke out between the barons, led by Simon de Montfort, and the Royalists, whose principal leader was the Prince Edward. The Royalists were defeated at the battle of Lewes, and the king and prince became prisoner The Mise of Lewes followed, and in 1265 was held the famous parliament of Simon de Montfort, to which the Commons were summoned. Later in the year Prince Edward escaped, defeated the barons' army, now much weakened by desertion, and killed Simon de Montfort. The death of Simon, however, did not interfere with his policy, since this was carried out by the Prince Edward. The remainder of the reign of Henry III. passed quietly away, the chief power up to 1270 being in the hands of Prince Edward, who in that year departed to the East on crusade. In 1272 Henry III. *d.* and although it was two years before Edward I. returned, yet there was no disputed successor and everything worked quietly whilst Edward was out of the country. The early part of his reign was occupied with the conquest of Wales, and the belittling of the power of the baronage and Church. Part of his great aim was to construct a united Great Britain, and the Socttish war which raged practically from 1294-1307 was a result of the attempt to carry out this policy. The barons also insisted upon a re-issue of the Charter, and it is of importance to notice that even from as strong a king as Edward I. it was possible to wring reforms. In 1295 the Model Parliament met, framed on the same plan as Simon de Montfort's parliament. Edward attempted to deal with the Scots as he had done with the Welsh, but found the task harder than he had expected. He *d.* in 1307, with the Scots still in open rebellion against him, and just after Robert Bruce had been crowned king. With his dying breath he implored his son to continue the struggle against them. Edward II. succeeded his father, but his rule was influenced throughouɹ by his favourites, Gaveston and the Despensers. In 1314 he gathered the largest army which had ever been sent into Scotland, and proceeded to attempt to relieve Stirling, then besieged by Bruce. He fought the battle of Bannockburn and met with the greatest defeat ever inflicted upon the English by the Scots. In 1327 the conspiracy of the queen and her lover, Mortimer, caused him to be deposed, and in the following year he was cruelly murdered in Berkeley Castle. He was succeeded by his son Edward III., one of England's warrior kings. At the beginning of the reign the independence of Scotland was recognised, and the reins of government passed for a short time into the hands of the queen-mother and Mortimer. In 1330, however, Edward III. asserted his position and became sole ruler. The early part of his reign was taken up with a Scottish war, and then finally, in 1337, Edward claimed the throne of France in right of his mother. The claim was obiously but a pretence, since Edward had previously recognised the King of France and done homage to him for Guienne. In 1346 he won the battle of Crecy, and in the following year besieged and captured Calais. In 1346 also Neville's Cross had been won, and the Scottish king taken prisoner. The French war ceased in 1349 owing to the outbreak of the Black Death, a plague which helped very largely in the social revolution which followed. The condition of the serfs and peasantry of England was helped very largely by the devastation caused by that plague. In 1356 the Black Prince won the battle of Poitiers. This was the last great victory of Edward's reign. He *d.* in 1377, preceded by his son the Black Prince. He was succeeded by his grandson, Richard II. Richard had a certain amount of ability, which, however, was not always employed in the right direction. He was certainly fearless, and to a certain extent popular, but the period of his personal rule was tyrannical, and Bolingbroke, returning from exile in 1399, was easily able to depose him. He was imprisoned and finally murdered in Pontefract Castle. With him ended the Plantagenet line of kings. Henry IV., who succeeded Richard II., was the eldest *s.* of John of Gaunt, the third son of Edward III. He claimed the throne, not by conquest, but by parliamentary election, and was the founder of the House of Lancaster. He ruled the country wisely and prudently, he was never personally popular, but he kept the country at peace. In 1403 Hotspur rebelled against him, and was supported by Owen Glyndwr, both of whom were overthrown by Henry IV. at the battle of Shrewsbury. Henry also persecuted the Lollards, a name given to that section of the early Protestant Church who followed the teachings of Wyclif. After a long and painful illness Henry IV. *d.* in 1413. He was succeeded by his *s.* Henry V. concerning whom so many stories are told of the wildness of his youth. He, however, proved himself a strong and capable king, but did not live long enough to enjoy the fruits of his triumphs. He also persecuted the Lollards, and renewed the war with France. In 1415 he achieved a notable victory at Agincourt. France was at this time divided into factions, and taking advantage of this fact, by judicious alliances Henry succeeded, in 1420, in forcing the French king to sign the Treaty of Troyes, which gave Henry the French king's daughter's hand in marriage, the regency of thd country, and the ultimate succession to the throne of France. In 1422, just after the birth of an heir to him, he died. He was succeeded to the thrones of both France and England by his young son, Henry VI., for whom the regents, Bedford and Gloucester, administered the country. During the early part of the reign the English still continued to win victories, but finally the French settled the differences amonst themselves, and after the appearance of the Maid of Orleans went from victory to victory, finally, in 1454, driving the English out of everywhere save Calais. At home the war expenses and the constant stream of returning soldiers made social conditions bad, and this found expression in the revolt of Cade in 1450. Meanwhile, the king had had lapses from sanity, and the Yorkists began to claim the throne; alleging, and correctly, that their candidate, Richard, Duke of York, was the more direct descendant of Edward III. The argument was answerable in only one way, and that was that the Lancastrians were on the throne by right of election by parliament. In 1455 war definitely broke out, and lasted up to 1471. The Yorkists were at first successful at St. Albans, and the king fell a prisoner into their hands. In 1460 York was defeated and slain at Wakefield by Margaret of Anjou, but the Earl of March, coming up from the W., entered London, was proclaimed king, and marching up northward defeated Margaret at Towton. For some time the country remained more or less at peace; the kingmaker dictated the policy of the country. But the king flouted the great earl on two occasions, and drove him to the camp of the Lancastrians. Warwick landed from France and forced Edward into exile, proclaiming Henry VI. again. Edward, however, returned unexpectedly from exile, defeated and slew Warwick at Barnet, crushed the last hope of the Lancastrians at Tewkesbury, and again established himself firmly as king. Edward *d.* in 1483. His son, Edward V., succeeded him, only to be murdered in the Tower, after a two months' reign, by his uncle, Richard of Gloucester, who on the death of the prince and his brother caused himself to be proclaimed as Richard III. He was a brave prince and a prince who had good ideas and ability to carry them out, but he was unpopular, and gradually the story of the murder of the princes increased this unpopularity. A conspiracy was made against him by Henry Tudor, Earl of Richmond, who landed in the country from France, met Richard at Bosworth Field, and there defeated and slew him, owing principally to the wholesale desertions of Richard by the nobles. Henry was crowned on the battlefield. Henry Tudor was descended on his father's side from the Tudors, on his mother's (illegitimately) from John of Gaunt, and was therefore hailed by the Lancastrians as the representative of their line. He claimed the throne by descent and by election, and finally put an end to the rival claims by marrying Elizabeth of York, the *d.* of Edward IV., thus uniting the two lines. He crushed the remaining power of the baronage, he overthrew what little power remained to the clergy, he ruled despotically, but he restored the industries of the country and raised England again to the rank of a European power. He was miserly, but to him the possession of money meant the possession of power. The attempts of Simnel and Warbeck were defeated, and Henry's position was strengthened by the marriage of his *s.* to Catherine of Aragon, and his *d.* to James IV. of Scotland, both marriages of vital importance to England. He *d.* in 1509, leaving Henry VIII. with a secure hold on the throne and the affection of the people. The reign of Henry is notable chiefly for the separation of the English Church from Rome. At the beginning of his reign there was some slight troubles with France and Scotland, the Scottish war being ended in 1513 by the battle of Flodden. Wolsey, Henry's chief minister during the early part of his reign, remained firm to the policy of preserving the Balance of Power. The Emperor Charles V. and the French constantly bidding one against the other for the friendship of England, Henry's attitude towards the doctrines of the Church may be judged from the fact that he published a book against the doctrines of Luther, and received in gratitude from the papacy the title 'Defender of the Faith.' By 1526, however, he had grown tired of his wife, Catherine of Aragon, and began to have religious scruples as to the validity of the marriage. He demanded, through Wolsey, a dissolution of the marriage and a decree of nullity, and would probably have obtained it had it not been for the fact that the troops of Charles V. (Catherine's nephew) had just captured Rome, and the pope was in their hands. Finally, the pope appointed two legates, Wolsey and Campeggio, to try the case, but Campeggio received orders that it was to be adjourned to Rome. In the meantime, Henry was becoming more and more angry; he desired to marry Anne Boleyn, and he thought that Wolsey was putting unnecessary obstacles in the way. When the trial was adjourned to Rome he disgraced Wolsey, and taking the advice of Cranmer and Cromwell, he broke away from Rome and forced the English Church to obey him as supreme head of the Church. There was no change in doctrine save in a few minor points. The Six Acts forced the doctrines of the Church of Rome on the English Church, but Henry was now head of the Church and not the pope. In order to obtain full control over the churches, the monasteries were dissolved. In 1536 the smaller ones went; in 1539 the larger monasteries suffered also. Their lands enriched the king and the nobility. During the later years of the reign a tendency towards Protestantism became more apparent in the country. In his old age Henry became merely a brutal tyrant; he *d.* in 1547, having married six times. He had been given authority to settle the succession for himself. By his will he had left the throne to Edward VI., to be followed, if he died without children, by Mary, *d.* of Catherine of Aragon; she in turn to be followed by Elizabeth, *d.* of Anne Boleyn. Edward VI. was only nine years of age when he succeeded; the country was ruled for him by the protectors, Somerset and Northumberland. During this reign Protestantism first gained a secure footing in the country. The churches were stripped of images, the Catholic service was stopped, and the first English Prayer Book was issued. In many parts of the country this attempt to oust the Catholic religion was deeply resented, but in spite of this Protestantism spread. In 1553 Edward VI. *d.* He also left a will which set aside that of his father, and gave the throne to the Lady Jane Grey. This plot was due to the influence of Northumberland, who knew that his power was at an end the moment that Mary succeeded to the throne. Mary, however, found no difficulty in obtaining recognition, and Northumberland, Dudley, his son, and the Lady Jane Grey were committed to the Tower, and later beheaded. Mary had always been a fervent Catholic; she now restored the Catholic religion, and for a time England reverted to the papacy. She married Philip II., King of Spain, and this, together with the religious persecutions which took place, did much to make her unpopular. Mary *d.* in 1553; she was disliked by her subjects, but she was perfectly sincere in her convictions. She did not persecute viciously, but from a sincere belief that that which she did was right. From her childhood upwards she lived a dreary and unloved life; it is not very strange then that she should have been somewhat of a fanatic. She was succeeded by her half-sister, Elizabeth, who found little difficulty in obtaining the throne, and was from her accession regarded by the majority of her subjects with affection. Her great danger, politically, lay in Scotland and Spain. France could, for the time being, be disregarded, since internal affairs kept her busy and desirous of peace. Scotland was disturbed by the religious quarrels, and, finally, Mary Queen of Scots, Elizabeth's greatest rival, was driven a fugitive into England, where she remained a prisoner until her execution in 1587. The following year came the great Armada, the blow Elizabeth had long expected, but which had been delayed whilst both sides tried what diplomacy could do. English seamanship and the elements combined to wreck the hopes of Spain, and the shattered Armada returned home defeated. This was the crowning victory of Elizabeth's reign; no longer need she dread the power of Spain; England was at last one of the great powers. But the point to be noticed most during Elizabeth's reign is that series of events which may best be described as the English Renaissance. The sea rovers plundered the Spanish Main, discovered new lands, and made a name for themselves throughout the world. Elizabeth *d.* in 1603. She was succeeded by James VI. of Scotland and I. of England. Thus the united Great Britain of Edward I. was accomplished owing to the marriage schemes of Henry VII. The early events of the reign were the attempts to reconcile Puritanism and Anglicanism, which failed, and the Gunpowder Plot of 1605. During this reign we find all the essential causes of the civil war which broke out during the next reign ready at hand; the mistaken foreign policy, the unpopularity of the king, the unjust taxation, and the desire to rule despotically, this time by right divine. The Stuarts tried to carry on the old policy of the Tudors, and to be despotic monarchs. The essential difference between these two dynasties was that whereas the Tudors were personally popular, the Stuarts were not, whereas the Tudors ruled despotically only because the people supported them, the Stuarts failed because they attempted to rule by divine right and in spite of the people. It must be remembered that from this period onward, towards the end of the century, Puritanism played a great part, and Puritanism meant not only a desire for liberty of worship, but also political liberty as well. It was in the struggle against Puritanism that divine right and passive obedience were overthrown. During the reign of James, the Thirty Years' War broke out in Europe, and the king tried to pose for a time as the arbiter of Europe. His schemes failed, and he *d.* in 1625 with the reputation of being the wisest fool in Christendom. Charles I. succeeded. His reign may best be described as one long series of blunders. Parliament attacked his favourites, refused him supplies, and, finally, in 1627, forced the Petition of Rights upon him. From 1629 to 1640 he ruled without a parliament. During this period occurred the famous ship-money cases, and continual breaches of the law. Finally, it was on the rock of the Church in Scotland that Charle foundered. His attempts to imitate his father and force Episcopacy on the Scot roused anger in Scotland, the introduction of the Prayer Book of Laud led to open rebellion, and the first Bishops' War broke out (see SCOTLAND). The Short Parliament 1640 was summoned and dissolved within three weeks. Then followed the Long Parliament, which undid the work of the eleven years' tyranny, but which at the same time did much that was unconstitutional. Stafford was executed; Laud met with the same fate later. Ship-money was declared illegal, the Star Chamber abolished, and finally the king was forced to consent to the reading of the Grand Remonstrance. He then made his fatal mistake; he attempted to arrest five members, and failing, left London. He went N. and tried to enter Hull, but was refused admission, and finally, on Aug. 22, 1642, he raised his standard at Nottingham. At first the Royalists were successful, but this was due chiefly to the fact that the Royalists were more accustomed to arms than the Roundheads; but finally came the formation of the New Model Army, and the defeats at Marston Moor and Naseby. The king surrendered to the Scots, and was finally handed over to the English, by whom, after prolonged negotiations and the outbreak of the second Civil War, he was executed Jan. 1649. For the next eleven years England was a commonwealth—for the first four years a republic, for the remaining seven a protectorate. The execution of the king roused horror throughout Europe; Scotland and Ireland rose in revolt, and Charles II. was crowned in Scotland, but Dunbar and Worcester settled the Scots, whilst Wexford and Drogheda performed a similar mission for Ireland. For a short time England, Scotland, and Ireland were united. In 1653 Cromwell became protector. In 1658 Cromwell *d.*, and chaos reigned for a time in England. Richard Cromwell was inefficient, and finally Monk, marching down from Scotland with the army, declared in favour of a free parliament which restored Charles II. The reign of Charles is one of the most sordid in English history. It was a period of national disaster and shame; the guns of the Dutch were heard on the Thames from the city of London. In 1665 broke out the Great Plague, and in the following year the Great Fire destroyed London. The Popish Plot led to the introduction of the Exclusion Bill, and the Petitioners and Abhorrers formed the nucleus of the Whigs and Tories of the following century. The country was inflamed by religious quarrels, and through it all Charles worked quietly for the restoration of the Catholic faith. Towards the end of his reign, when everything seemed blackest, he appealed to his people, and the latter years of his reign were years of triumph. He *d.* in 1685, witty and cynical to the end. James, Duke of York, who succeeded him, inherited far more of the attributes of his father, Charles I. His obstinacy led him into difficulties which his brother would have avoided, and his open avowal of the Catholic faith, whilst it did not at first alienate his subjects, prepared the way for the Revolution. James openly attempted to restore the Catholic faith. An heir was *b.* to James, and this made a speedy action necessary, Hitherto the next heir to the throne had been Mary, the *d.* of James II., a Protestant, and the wife of William of Orange. Now it was certain that the heir would be educated in the Catholic faith. Messengers were despatched to William of Orange. Louis XIV., filled with anger at the treatment he was receiving at the hands of James II., invaded the Palatinate, and William was free to enter England. On Nov. 5 he landed at Brixton; before the end of the year he was in London, and by that time James had fled, had been recaptured and permitted to escape again. William and Mary signed the Declaration of Right and were declared joint sovereigns, whilst Catholics or any who should marry a Catholic were barred from succession to the English throne. The Revolution had been bloodless. The Revolution settlement was moderate, owing principally to the wisdom of William III. Rebellions broke out in Scotland and Ireland, but were speedily crushed. In 1692 the Massacre of Glencoe took place, and Ireland, after the Treaty of Limerick, gave no more trouble until the end of the century. That the Irish had right on their side when they spoke of betrayal there can be no doubt, England in the meantime engaged with Holland in the war of the Protestant Succession against Louis XIV., and although William was not a successful general, still, in 1697, the Treaty of Ryswick made Louis acknowledge for the first time that he had not been altogether successful. Both sides, however, now prepared for the greater struggle which they saw must come. The question of the Spanish Succession must soon be settled, and both William and Louis were interested in that settlement (see SPAIN—*History*). The Partition Treaties were drawn up and agreed to, but finally Louis accepted the will of the Spanish king which left Spain to the French king's grandson, and England and France again prepared for war. But even now the English were not prepared to go to war on the point of the Spanish Succession—only when Louis made the second of his great blunders. James II.

d., and he acknowledged the Old Pretender as James III. England immediately clamoured for war, and during the preparations William III. *d.* 1702. He had already been preceded by Mary, who *d.* 1694, and since they had no children, was succeeded by Anne, the second *d.* of James II. The war of the Spanish Succession broke out at the beginning of the reign. The war was fought in order to preserve the Balance of Power in Europe and prevent France from dominating the whole of the Continent. Marlborough, the English commander, won the victories of Blenheim 1704, Ramillies 1706, Malplaquet 1705, Oudenarde 1709. Gibraltar was captured by the allies and Louis was forced to acknowledge defeat, but the allies pressed terms too heavily upon him and he made another desperate effort to free himself, succeeding certainly in lightening the terms imposed on him. Meanwhile at home the Tories had become powerful and were desirous of peace, and so in 1713 was signed the Treaty of Utrecht, which gave us the beginning of our colonial empire but which ought to have given us more. The English further deserted their allies and made terms only for themselves. In 1707 the Act of Union between England and Scotland had been passed and had come into force (see SCOTLAND—*History*), and towards the end of the reign the question of succession had to be settled. The last child of Anne had *d.* in 1700, and the Act of Settlement had vested the crown on the nearest Protestant heirs of Sophia, Electress of Hanover, and her descendants. But the Tory ministers, St. Johns and Harley, plotted the restoration of the Stuarts, and it was well known that the queen favoured the restoration of her half-brother, but the sudden death of the queen and the swift measures adopted by the Whigs prevented any serious steps from being taken, and in 1714, on the death of Anne, George I. was proclaimed without difficulty. The Acts of Union of 1707 had made England and Scotland one under the name of Great Britain. The chief events of the reign of George I. were Jacobite risings, the divorce of the Queen, and the South Sea Bubble. He was succeeded in 1727 by George II., whose reign was uneventful, except for the rebellion under Charles Edward Stuart, the Young Pretender. George III. became king in 1760. His reign saw the expansion of the Empire by the inclusion of India, and its loss by the successful revolt of the American colonies. The legislative union of Great Britain and Ireland was effected during his reign.

England in the 19th and 20th Centuries.—Three features especially distinguish the 19th cent. in England: (*a*) the industrial revolution; (*b*) the wide overseas expansion; and (*c*) the democratic extension of political power. At the beginning of the 18th cent. England was by no means conspicuous as a manufacturing and commercial country, but by its close Lancashire and Yorkshire were fast becoming the seats of the cotton and woollen industries; Staffordshire and Yorkshire had established themselves as pottery and hardware centres; and Durham and Northumberland were specializing in mining industry. Suddenly, with the new cent. came a remarkable development of manufacturing machinery driven by steam. The application of these new methods to the vast wealth of Great Britain in coal and iron, and the command of raw materials secured by her maritime supremacy, rapidly converted her into the 'workshop of the world,' and made her an industrial instead of an agricultural nation.

The industrial revolution coincided with a remarkable increase in England's imperial responsibilities. The Amer. War, which had lost England the United States, roused Englishmen to a fuller realization of their duties to their colonies and dependencies. Numerous India Bills, a more enlightened view with regard to Ireland, and a tendency towards reforms, financial, political, and social, represent the principal effects of the Amer. War upon home politics. To keep the peace of Europe as far as possible, and to restore England's prestige, Pitt, in 1788, formed with Prussia and Holland the triple alliance. The outbreak of the French Revolution in 1789 checked Pitt's reforming and peace policy, and in 1793 France forced England into war. Till the Peace of Amiens in 1802 hostilities with France continued in all parts of the world. At sea, and in India and Egypt, England was successful, but she could do little to aid her ally Austria on land. At home Pitt enacted a number of repressive measures to check revolutionary feeling, while his financial schemes proved very effective. A rebellion in Ireland in 1798 led to the union of England and Ireland in 1800. The following year Pitt resigned. In 1803 war between England and France was renewed, Napoleon being determined to gain command of the sea, and and to ruin Eng. commercial and colonial prosperity. Unable to invade England, he endeavoured by his Continental System to prevent the importation into any part of the continent of Europe of any English goods. Till 1810 Napoleon's star was in the ascendant, but at the end of that year Russia's adhesion to the Continental System was modified, while in Spain the French were unable to crush the national resistance or to drive the English out of Portugal. The failure of the Moscow expedition was followed by the defeat at Leipzig and the invasion of France by the allies. Though Napoleon's imprisonment in Elba, his escape and subsequent defeat at Waterloo 1815, disturbed the allies for a time, his exile to St. Helena enabled the Great Powers assembled at Vienna to effect the settlement of Europe.

England came out of the war with increased prestige and her possessions enlarged. Reform of Parliament and Catholic emancipation were again mooted, and measures for the benefit of trade were adopted. Canning, while opposing the reactionary schemes of Russia, Prussia, and Austria in Europe, and favouring the grant of independence to Greece, was opposed to parliamentary reform. Shortly after his death the Test and Corporation Acts were repealed, and Catholic emancipation was carried. It only remained for the accession of the liberal-minded William IV. and for the outbreak of the French Revolution of 1830 to ensure the passing of the great Reform Bill of 1832. By it the power of the aristocracy was broken, and was transferred to the middle classes. The bill was a necessary result of the Revolution of 1688, and, like that revolution, was a Whig triumph. Many beneficent measures followed, and at the same time a Church revival coincided with the political movement. Both politics and religion were stirred by a new spirit, which was apparent at the time of the accession of Queen Victoria in 1837. The Victorian age, which produced able ministers such as Peel, Russell, Palmerston, Disraeli, Gladstone, and Salisbury, saw a remarkable development in every department of national life. Railways, the telegraph and telephone systems and electricity revolutionized commerce, and brought all parts of the U.K. into close communication. The repeal of the Corn Laws in 1846 cheapened food, and the parliamentary suffrage was, some twenty years later, extended. During Victoria's long reign the government of Ireland was improved, the Brit. possessions in India, China, and Africa were considerably extended, and many wars were engaged in. The Crimean War was, however, the only great European war in which England was directly concerned. The Indian Mutiny strengthened our hold upon India; in 1879 a rising of the Zulus resulted in the conquest of Zululand; and in 1899 the invasion of Natal by the Boers of the Transvaal and Orange Free State provoked a war which dragged on during the remainder of Victoria's reign. The growth of what is called Imperialism dates from the last decades of the 19th cent., and was due to a variety of causes. The anti-British attitude of Bismarck led to prohibitive tariffs, and forced Britain to find new markets for her goods. A strong navy thus became a necessity, and close relations with our colonies a matter of the first importance. In 1901 Queen Victoria *d.*, and Edward VII. ascended the throne. The nine years of his reign were constitutionally very important. Peace was signed with the Boers in 1902. In the same year Mr. Balfour became prime minister, and carried his Education Act, which gave rate aid to voluntary schools, abolished school boards, and placed education under the control of county councils. In 1903 the king attended a great coronation durbar at Delhi. Chamberlain's Tariff Reform campaign had now begun and was dividing the cabinet. The year 1904 saw a departure from traditional foreign policy in the alliance with Japan, the Anglo-French agreement and the *entente* with our Gallic neighbours. Mr. Balfour's government resigned in 1905, and the Liberals came into power with a vast majority. In 1907 self-government was granted to the Transvaal and Orange River Colony, and the Territorial Army, afterwards to be the basis of the national armies raised during the Great War, was established. Mr. Asquith succeeded to the premiership on the death of Sir Henry Campbell-Bannerman in 1908, and in the same year old age pensions were inaugurated. The closing years of Edward VII.'s reign were marked by extraordinary political excitement consequent on the rejection of the Finance Bill by the Lords, who objected to certain land taxes therein incorporated. The constitutional question involved roused the country, and a general election in 1910 supported the government, which thereupon introduced a Parliament Bill limiting the veto of the House of Lords. Amidst much national excitement the Lords, 'swearing they would ne'er consent,' consented, and passed the Finance Bill. In 1909 the Union of S. Africa was completed, and in the following year King Edward *d.* May 6. Grave suffragist outrages took place towards the close of the year, in which a general election once more placed a Liberal government in power. In 1911 the Parliament Bill passed the Commons, but was drastically amended by the Lords. Threatened with the creation of sufficient peers to carry the bill, the Lords accepted the measure. In the same year the Agadir incident foreshadowed the growing aggressiveness of Germany. In 1912 National Health Insurance came into force, payment of members of Parliament began, and a Home Rule Bill for Ireland was introduced. A violent anti-Home Rule campaign was begun in Ulster, a covenant was signed, and in the following year the Ulster volunteers threatened armed resistance. The Lords threw out both the Irish Home Rule Bill and the Welsh Disestablishment Bill, and in the early months of 1914 Mr. Asquith assumed the post of war minister. There was gun running in Ulster and the raising of a large force of Nationalist volunteers. The Home Rule Bill and Welsh Disestablishment Bill were passed under the Parliament Act; but by this time the country had become involved in the Great War, and both Acts were suspended until the termination of hostilities. A conference called by the king at Buckingham Palace between Ulster and Nationalist representatives proved abortive. For the events leading up to Armageddon, see THE WORLD WAR, and for the making of peace and settlement of Europe, see PEACE CONFERENCES.

A Coalition Government was formed in May, 1915, for the purpose of carrying out the war, and in Feb. 1916 the first Military Service Act was passed, providing for compulsory military service. During the following Easter week a rebellion broke out in Dublin. In Dec. of the same year Mr. Asquith resigned, and Mr. Lloyd George formed the second Coalition, which continued in being until Oct. 1922. On July 25, 1917, a convention of representative Irishmen 'to submit to the Brit. Government and Parliament a constitution for the future government of Ireland within the empire' held its first meeting, and elected Sir Horace Plunkett as chairman. The convention continued its sittings for nearly nine months, but did not arrive at any practicable measure of agreement on the main points. In the Feb. of 1918 the Representation of the People Act was passed, which gave votes to women of thirty years of age, in other ways largely extended the suffrage, and was accompanied by Redistribution.

The years following the end of the World War were marked in England by plans for reconstruction, by disturbances in Ireland, and by participation in the conferences on the continent carried on in order to bring about possible economic and political equilibrium. The affairs of Ireland are discussed under IRELAND. England refused to take an active part with France in the occupation of the Ruhr district of Germany, in Jan. and Feb. 1923. The government declared its neutrality. Actual conflict with Turkey was barely averted in 1923 by threats of the Turkish Nationalist Army, under Mustapha Kemal, to forcibly take possession of Constantinople, which was protected by a small detachment of British troops. At the conference of Lausanne, the British commissioners opposed several of the propositions advanced by the Turks but in the main gave way to the Turkish demands. See TURKEY; LAUSANNE CONFERENCE. The Coalition Ministry of Lloyd George remained in power until Oct. 1922, when largely as a result of the Premier's aggressive attitude toward Turkey the Conservatives won a decisive victory and won a substantial majority in the House of Commons. A notable feature of the election was the large proportion of Labor members elected. These numbered 142. The matter of the war debt owed by Great Britain to the United States was a matter of discussion in both countries in 1922-23, and was finally settled at a conference between delegates from both countries at Washinton, in Feb. 1923. See DEBTS, WAR. The economic condition of England was much sounder than that of any other country in Europe, and trade rapidly increased. The burden of taxation, however, rested heavily on all classes, and specially the wealthier people and those possessing large estates. The taxes levied made it necessary for many large land owners to sell their property, as the rate of taxation made its continued ownership prohibitive.

ENGLAND, CHURCH OF, a term meaning not simply Eng. Christianity but the Anglican Church. Its story cannot be separated from Eng. history. The beginnings of Eng. Christianity are obscure, but it is probable that Roman missionaries came in with the Roman soldiery in the 2nd cent. A native Celtic Church arose which was swept away by the Anglo-Saxon invaders in the 5th cent., except in Celtic parts of Britain. (For Celtic Christianity, see PATRICK, ST.; COLUMBA, ST., etc.) Christianity was reintroduced into South Britain by St. Augustine in 597, but the progress of the faith was gradual, and by degrees Celtic tradition gave in to the Roman in the observances of Easter and some other matters although the Church of England retained many distinctive customs and characteristics of her own.

At the Norman Conquest the Eng. Church entered more into the main stream of Western Christianity, and was very similar to the rest of the Churches under the sway of the Roman see, although the supremacy of the Pope in all matters was never completely acknowledged, except for a short period under John. Continual strife between Church and State took place over the Church courts. A climax was reached in the quarrel between Henry II. and Thomas Becket. The 14th cent. saw the beginning of Lollardy, led by John Wyclif—a religious movement which mingled with schemes of social reform. A strong anti-clerical feeling had grown up as a result of the ecclesiastical abuses of the day, and anti-papal legislation was passed. Lollardy was suppressed, but it smouldered, and with the advent of the New Learning and the outbreak of the continental Reformation a new era dawned.

The changes which took place in England under Henry VIII., the formal repudiation of the papal supremacy and the restatement of the freedom of the Anglican Church, the thoroughgoing protestantism of Edward VI., the reaction under Mary, and the Elizabethan *via media*, show the intimate relation of Church and State in England.

In the 17th cent. came the *Puritan* movement, which entered the political sphere in the Civil War and Commonwealth. The Restoration, followed by the permanent separation of *Nonconformists*, began the modern condition of religious life and parties in England.

The 18th cent. was a tine of comparative though not of absolute stagnation, until the *Methodist revival* at its close; though this started within the bounds of the Church it eventually passed outside it. In the 19th cent. came the *Oxford Movement*, which, carrying the revival of religious life into other channels than Evangelicalism, revived some points of Catholic tradition, reintroducing some practices that had been obsolete since the Reformation. This has produced the modern *Anglo-Catholicism*, in which sometimes the doctrinal side, sometimes the ritual is stressed.

The doctrinal standard of the Church of England is the *Book of Common Prayer*, as last revised in 1662. The Church is represented in the House of Lords by the Archbishops of Canterbury and York, and most of the bishops of England. The Church of Ireland was disestablished in 1871, the Church of Wales in 1920. It is important to remember that the Church of England is the mother-church of a large Anglican communion existing throughout the Brit. Empire, and in many other parts of the world. For recent legislation establishing a National Assembly of the Church of England.

ENGLAND, GEORGE ALLAN (1877), American author. *B.* in Nebraska. Educated at Harvard College and is a Phi Beta Kappa. He was honorary vice-president of the Writers Club and a member of the Authors League. He was the author of many poems, photoplays and short stories, Among his novels are 'Underbeath the Bough', 1903; 'The Story of the Appeal', 1914; 'Darkness and Dawn', 1914; 'The Air Trust',1915;'Pod Bender and Company', 1916; 'The Golden Blight,' 1916; 'The Gift Supreme', 1916; 'Cursed', 1919; 'Their Son', 1919; and 'The Flying Legion', 1920.

ENGLEFIELD, SIR FRANCIS (*c.* 1520-96), R. C. adherent of Queen Mary; supported persecution; went abroad, 1539; plotted against Elizabeth, attainted and estates forfeited, 1585; lived in Rome, Netherlands, and Spain.

ENGLEWOOD, a city of New Jersey, in Bergen co. It is on the Erie Railroad and is chiefly a residential city. It has a hospital, public library and other public buildings. Pop. 1920, 11,627.

ENGLISH ARCHITECTURE. See ARCHITECTURE.

ENGLISH ART. See ART.

ENGLISH BIBLE. See BIBLE.

ENGLISH CHANNEL, narrow sea between England and France (50° N., 2° E.-6° W.); joins the North Sea at Strait of Dover, its narrowest part (*c.* 21 m.), and, owing to chalk ridge, also its shallowest (12 to 13 fathoms); stretching W., joins Atlantic between Scilly Isles and Cape Ushant. Area is *c.* 23,900 sq. m.; length, *c.* 350 m.; average breadth, over 70 m.; highest tide, 42 ft. at St. Germain. Cliffs and lowlands alternate on both coasts; Eng. coast extends from Strait of Dover to Land's End. Only important river it receives is Seine, from France. In English Channel are Isle of Wight and Channel Islands. The chief seaports are (in England) Falmouth, Plymouth, Southampton, Portsmouth, Brighton, Newhaven, Hastings, Folkestone, Dover; (in France) Cherbourg, Le Havre, Dieppe, Boulogne, Calais. English Channel is called in French *La Manche* (the sleeve), owing to its shape; was scene of defeat of Span. Armada 1588. A proposal to construct a Channel Tunnel was made in France in 1856, and several other schemes to avoid the sea-passage have been mooted since. Captain Webb swam the Channel in 1875, Burgess in 1911. Bleriot was the first to fly across in a monoplane ,July 1909.

For war operations in English Channel, see DOVER PATROL.

ENGLISH, FRANK CLARE (1869), American College President. *B.* in Ohio. Bachelor of Arts of University of Cincinnati and Baldwin University

1897. Drew Theological Seminary, 1897 and Ohio Wesleyan University, 1908. Doctor Divinity Moores Hill College, Indiana 1904. Ordained 1894 Methodist Episcopal Minister. Was Pastor 1900-1904 of Columbia Methodist Episcopal Church, Cincinnati. President Moores Hill College 1904-1908. President Cincinnati Training School 1908-1909. President William and Vashti College, Illinois 1911-1915. Director for the Interchurch World movement for Surveys American Hospitals and Homes in 1919. Was General Secretary and Treasurer of Protestant Hospital Association of America. Writes on popular subjects, economics and sociology. Was director of University of North Dakota.

ENGLISH LANGUAGE.—English belongs to the Teutonic group of the Aryan or Indo-European languages, which comprise most of the literary languages of Europe. Teutonic is further subdivided into Scandinavian and Germanic, to which latter group English belongs. Originally it was a Low or N. German dialect or collection of dialects spoken by the Angles, Jutes, Saxons, and Frisians dwelling on the N.W. coast of Germany and in modern Schleswig-Holstein, and the languages which it resembles most to-day are Dutch and Frisian.

On the English coming to Britain A.D. 449-547, they found it occupied by a Celtic race, just freed from Roman government, speaking in the towns a Latin dialect and in the country at large a Cymric or Britannic form of Celtic from which Modern Welsh is descended. From these two languages the English learnt practically nothing; the names of their oldest cities are Latin (*cf.* Chester, from *castra*, 'Camp'); most of the rivers (*cf.* Avon, Esk, Ouse) and hills (Pennine Chain) are Celtic; otherwise the only words probably of Celtic origin, that English owes to the Early Britons are *down* (a hill), *combe*, *bin* (originally, 'a manager'), *dun* (the colour), *crock* (a pitcher), and one or two others. Between 597 and 630 England was taught Christianity, in the S. by the Roman Augustine, in the N. by the Irishman Aidan, and through this new teaching English first became a literary language. The history of the language as seen in this literature has been divided into three periods—Old English A.D. 630-1150, Middle English 1150-1550, and Modern English 1550 onwards.

About 1550 the Modern English period began. This has been called the Period of Lost Endings, as most of the inflectional endings disappeared during it (*cf* M.E. *drinken*— Modern E. *drink*). But the most important change of this period was in the sound of the accented vowels (chiefly when long), which altered from the sounds they still have on the Continent to their present sounds in English (*e.g.*, in *mate*, *hide*, *but*). The gutteral *ch* sound has also disappeared, although represented in spelling (*cf. light*), which, for the language as a whole, has scarcely altered since 1600. The great influence upon English language in the 16th cent. was the Renaissance, or revival of classical learning. This led to many more words being borrowed from the Latin and Greek, not through French, but directly. During the Elizabethan period English attained a curious verbal flexibility which distinguishes it to-day from other European languages: a word, originally one single part of speech, may be used as any other part of speech (*e.g.*, *clean*, originally an adjective, is an adverb in *clean gone*, a verb in *to clean*, and a noun in *to have a clean*). And many writers after 1600 enriched English with words of their own coinage. In the 18th cent. more words were borrowed from French (*e.g.*, *anachronism*, *anecdote*, *decadence*, *suicide*) and from Italian, chiefly musical (*opera*, *soprano*, *piano*, *tenor*). In the 19th cent. and after, the growth of science and philosophy led to many more words being formed from Latin and Greek, such as *telephone*, *locomotive aeroplane*, *psychology*, *dogma*, *automobile*, *cinematograph*, *aviator*, *marconigram*.

The chief characteristic of Modern English is not elegance, but terseness and vigour, which renders it the best language for business purposes. The practical side of the Eng. race is shown in the simplicity of its grammatical forms and the logical order of its sentences. An unpractical side is show in the archaic and unphonetic spelling, dating from the 16th cent. Another characteristic of English which renders it capable of high poetic expression is its wealth of synonyms, arising out of the two languages, Teutonic and Latin, that build up its vocabulary. By means of these synonyms, English more than any other language can differentiate between the emotional and the intellectual idea.

ENGLISH LITERATURE.—Eng. literature in its beginnings is associated with the introduction of Christianity. The first known native writer was Caedmon, a monk of Whitby Abbey *d.* 680, but only a fragment of his verse rendering of the Book of Genesis remains. It is, however, believed that a considerable oral literature existed before his day. This consisted of heroic legends. Some of these traditions were probably reduced to writing in the 7th cent., examples surviving in the epic fragments known as *Widsith*, and the fine poem, *Beowulf*, in which are told the adventures of that hero with the monster, Grendel. Bede's *Ecclesiastical History* belongs to the 8th cent., but was written in Latin. The next considerable writer after Caedmon and the unknown author of *Beowulf* is Cynewulf (8th cent.), who wrote the poems *Christ*, *Elene*, *Fates of the Apostles*, and *Juliana*. To the 10th cent. belong the two excellent poems, *The Battle of Brunanburh* and *The Battle of Maldon*.

Eng. prose began with the trans. by King Alfred *d.* 901 of Lat. originals, and the same great king is credited with having commenced the *Saxon Chronicle*. Other later prose writers were Ælfric and Wulfstan. With the exception of these and the *Chronicles* of Peterborough and Worcester, there was little native literature of merit from the death of Alfred to about the middle of the 13th cent.—thanks to the troublous times (Danish invasions, Norman Conquest, etc.). Another writer who claims notice was Layamon (*fl.* 1200), whose poem *Brut* was derived from Geoffrey's chronicle, and the Anglo-Norman poet Wace. This poem introduced the Arthurian story into Eng. literature.

The Norman Conquest introduced a new language and a new literature, the influence of which was long felt; but though many of the legends and traditions then introduced became incorporated in Eng. literature, there were many others, such as *Havelok the Dane*, *King Horn*, *Guy of Warwick*, which were of native origin, and, though first written in Norman-French, had assumed a vernacular form by the middle of the 13th cent. From this period to the age of Chaucer 1340-1400 and his contemporaries, though there was a growing literature, there was nothing of outstanding merit, save the exquisite lyric 'Sumer is icumen in' (*c.* 1250), and perhaps another lyric, 'Alison' (*c.* 1300).

Age of Chaucer.—Fr. influence was still strong in England when Chaucer produced his *Canterbury Tales* and other poems, but though his subjects were often derived from Fr. sources, his genius transformed all that he touched and gave it distinction and native character. Chaucer was the first of the great Eng. poets, and the most notable literary figure of his age. Several of his contemporaries, however, demand consideration, amongst the most notable being John Gower, who wrote *Confessio Amantis*, William Langland, author of the *Vision of Piers Plowman*, and Laurence Minot, who wrote, in a northern dialect, stirring poems in celebration of the victories of Edward III. To these succeeded three poets of a distinctly Chaucerian type—Lydgate, Occleve, and Stephen Hawes. Eng. prose is represented by the writings of John Wyclif, 1320-84, Sir John Mandeville, and Sir Thomas Malory's *Morte d'Arthur* 1470. Mention must also be made of the considerable body of ballads, many of which may be attributed to the 15th cent.

A school of Scots poetry came into existence during this period, which was not without its influence on later Eng. literature, the authors including Barbour, Henryson, Dunbar, and Gavin Douglas. The trans. of *Froissart*, by Lord Berners, commenced to appear in 1523, between which date and the earlier publication of the *Morte d'Arthur* Caxton had translated and printed numerous prose romances and other works. Amongst other contributors to the wealth of Eng. prose must be mentioned Sit Thomas More 1478-1535, author of the *History of Richard III.*, and the theological writers and translators, Tyndale, Latimer, Coverdale, and Cranmer.

Elizabethan Age.—Eng. poetry, which had somewhat declined since Chaucer's death, was revived and developed by two young men of noble birth, Sir Thomas Wyatt 1503-42, and the Earl of Surrey 1517-47. They experimented in new measures, and introduced Ital. forms of verse, and so provided the vehicles of expression for later and greater poets. The brave and courtly Sir Philip Sidney 1554-86, achieved something approaching greatness in his *Astrophel and Stella* sonnets, and *Arcadia*; and the second great Eng. poet was discovered in his friend, Edmund Spenser 1552-99, whose *Faerie Queene* and other poems are amongst the masterpieces of Eng. poetry. Amongst notable prose works belonging to this period may be mentioned Roger Ascham's *Toxophilus* and *The Schoolmaster*, Richard Hooker's *Ecclesiastical Polity*, John Lyly's *Euphues*, Richard Hakluyt's *Principal Navigations*, and the numerous writings of Francis Bacon.

The dominant feature of Eng. literature in the age of Elizabeth was the drama, which began at an earlier period with the Miracle, Mystery, and Morality plays, and which reached its highest development in the hands of Shakespeare. But it may be noted that many of the dramatists of this period also achieved more or less distinction as narrative or lyric poets. Thus Marlowe would be notable if only for his narrative poem, *Hero and Leander*; Ben Jonson, besides being a great dramatist, was the author of *Underwoods* and some of the most exquisite lyrics in the language.

George Chapman translated the *Iliad* and the *Odyssey*; and if Shakespeare had never written a single play he would still be a great poet by reason of his incomparable *Sonnets*, his *Venus and Adonis*, and *The Rape of Lucrece*. There was also a considerable body of Elizabethan and early Jacobean writers, others than dramatists, who were distinguished as poets, and amongst these may be named Michael Drayton, author of *Polyolbion*, *Nymphidia*, etc.; Samuel Daniel, famed for his epistles and sonnets; William Browne, who wrote *Britannia's Pastorals*; the lyric poets, Thomas Campion and Thomas Carew; William Drummond of Hawthornden, the sonneteer and friend of Jonson; and that quaint and crabbed poet, Dr. John Donne, the first of the 'Metaphysical School.' Several of these poets, as has been noted, overlap into the Stewart period, but in style and manner they belong properly to the age of Elizabeth.

Age of Milton.—The latter part of the 17th cent. may be classed as the age of Milton. Amongst the courtly poets of this time were Wither, Suckling, Waller, and Cowley, and all Milton's own early poetry was written before the outbreak of the Civil War and the overthrow of the monarchy. But the severe rule of the Puritans, who closed the theatres and discouraged all forms of worldly pleasure, made itself felt in the literature of the period. Milton's poetic masterpiece, *Paradise Lost*, was written in his later years, and not published until 1667, but there were a number of other poets contemporary with him whose seriousness and religious fervour dominated all they wrote. Prominent amongst these were Richard Crashaw, George Herbert, Henry Vaughan 'the Silurist,' and Francis Quarles. Robert Herrick 1591-1674 was, however, a bard of another type. *B.* in the reign of Elizabeth, he *d.* in the same year as Milton, and his most characteristic work is distinguished by its wit, paganism, and lyric charm.

The note of high seriousness and the spirit of contemplation which distinguished the poetry of the Miltonic period is to be found no less in the prose. Milton himself, besides being one of the greatest of Eng. poets, was a distinguished prose writer. To this time also belong Izaak Walton's *Lives* and *The Compleat Angler*, Burton's *Anatomy of Melancholy*, Sir Thomas Browne's *Religio Medici*, and the masterly productions of Hobbes, Jeremy Taylor, Clarendon, and numerous others.

Age of Dryden and Pope.—The licentiousness of Eng. society in the period succeeding the Restoration introduced a decadent spirit into literature, yet it is worthy of remark that England's greatest epic, *Paradise Lost*, was published seven years after the Restoration. The dominant figure in the country's literature of this period was Dryden, who was forty-three years of age when Milton died, and whose first considerable poem was his *Stanzas on the Death of Oliver Cromwell* 1658. Had Dryden lived in any other period than that in which he did, he would doubtless have left the world his debtor by a much larger body of fine poetry; for the exigencies of his life compelled him to pander to the depraved taste of his age, and his work for the stage constitutes the larger part of his output. This, notwithstanding his contribution to England's poetical literature, was very considerable, and the masculine vigour of his lines has secured for him an honoured niche in the temple of letters. Other poets of this time who cannot be overlooked were Prior, Marvell, and Samuel Butler, the author of *Hudibras*. But though the output of poetry was somewhat meagre, the harvest of prose was singularly rich, and includes the works of such various writers as Sir William Temple, John Locke, Gilbert Burnet, Jeremy Collier, Isaac Barrow, Richard Baxter, George Fox, John Bunyan, and the diarists, John Evelyn and Samuel Pepys.

Pope 1688-1744 was destined to be the natural successor of 'glorious John,' as the elder poet has been called. The heroic couplet, however, in the hands of Pope, lost the vigour which had distinguished it when employed by Dryden, but what it lost by effeminacy it perhaps gained in wit and polish. In other words, the satire of Dryden might be compared to the stroke of a broadsword; that of Pope to the thrust of a rapier. Other poets contemporary with Pope were James Thomson 1700-48, author of *The Seasons*; Thomas Gray 1716-71, of 'Elegy' fame; and William Collins 1721-59, whose odes are amongst the best in the Eng. classic style. Like the age of Dryden that of Pope witnessed the production of many prose masterpieces. These include the satirical writings of Swift, the essays of Steele and Addison, the theological and critical works of Bentley and Joseph Butler, the philosophical writings of Berkeley, and the voluminous output of Defoe, the father of the Eng. novel.

Age of Johnson.—The next period of importance includes, besides the various writings of the great lexicographer Samuel Johnson, the works of Edmund Burke and Oliver Goldsmith, and the novels of Fielding, Smollett, Richardson, and Sterne. Two poets of eminence, William Cowper 1731-1800 and George

Crabbe 1754-1832, form a connecting link between the 18th and 19th centuries. The poetry of the former is distinguished by a gentle domesticity; that of the latter by a stern and rugged realism.

Daniel Defoe has been referred to as 'the father of the Eng. novel.' It is true there had been fantastic 'romances' published in England long before the days of Defoe, but they were chiefly adaptations from foreign sources, and were not by any means 'novels' as we now understand the word. Defoe was a journalist and pamphleteer by profession, and not until he was nearly sixty did he first turn his attention to fiction, and write his master-piece, the picaresque yet moral story *Robinson Crusoe* 1719-20. It was followed by his other autobiographical stories, *Captain Singleton*, *Moll Flanders*, and *Colonel Jacque*. Samuel Richardson 1689-1761 was over fifty years of age when his first novel, *Pamela*, appeared; this, together with its two successors, met with much appreciation. Richardson understood female character, but his men were not drawn with so firm a hand. Fielding 1707-54, began his *Joseph Andrews* as a burlesque of *Pamela*, but he was a writer of too original genius to remain content with parody, and the completed work failed in its earlier intention. In *Tom Jones* he produced a far greater work, which is generally considered his masterpiece. He was a more vigorous writer than Richardson, and drew both men and women equally well. Smollett 1721-71 was a novelist of coarser fibre. He gave the flesh-and-blood sailor to Eng. fiction; he drew largely on the adventurous element; but he is often unpleasantly coarse. Laurence Sterne 1713-68, by virtue of his *Tristram Shandy* and *Sentimental Journey*, has secured a place among the great novelists. After these came several writers of fiction who can be but named—Horace Walpole, Clara Reeve, Mrs. Radcliffe, 'Monk' Lewis, Henry Mackenzie, Robert Bage, and Fanny Burney. Maria Edgeworth's first novel appeared in 1800, Jane Austen's in 1811, Sir Walter Scott's in 1814, and Susan Ferrier's in 1818. See NOVEL.

The 19th Century.—In poetry a period of transition from the artificial style of the 18th cent. was reached in the works of Cowper and Crabbe. The next dominating influence was that of Robert Burns. Like Shakespeare, Burns borrowed not a little from his predecessors. He owed much to Robert Fergusson and Allan Ramsay. But what he borrowed he subsequently made his own. His sturdy individuality and close kinship with nature paved the way for Wordsworth, who became the high priest of Nature in all her moods. Of Southey little need be said. The great body of his verse is forgotten, but he lives deservedly by his fine *Life of Nelson* and a handful of lyrics. Thomas Campbell 1777-1844 gave to Eng. literature a few poems which will not readily be forgotten; and the same may be said of Chatterton and Blake. The 20th cent. desire for realism has led to Blake's being hailed as 'the English Nietzsche.' *The Ancient Mariner*, *Christabel*, and a few other poems by Coleridge are amongst the greatest treasures of Eng. poetic literature. Scott's romantic poems marked an epoch in Eng. literary history, but his fame will rest almost entirely on the Waverley Novels. The arrogant and tempestuous genius of Lord Byron drove Scott from the field of poetry. and though Byron's influence in literature and society lasted long after his death, it was subsequently effaced in England, though there have been gleams of a revival of appreciation. Shelley and Keats belong to the highest order of lyrical poets, and conquer by sheer beauty of form and expression. It is extremely unlikely that the exquisite quality of their work can ever lack admirers. Tennyson, who succeeded Wordsworth as poet-laureate, began as an imitator of Byron and Keats, but he quickly assumed a strong and unassailable position in poetry. His refined lyrical accomplishment, and his close interest in the affairs of his time, secured for him an extensive popularity. The sad and thoughtful note of Matthew Arnold's poetry made a deep appeal, and the excellence of his craftsmanship has been generally admitted. Robert Browning had to wait long for popular recognition. But notwithstanding the depth and sincerity of his work, the grotesqueness and cragginess of his style must ever militate against his success with the general reader. The poetry of his wife, Elizabeth Barrett Browning, though of a more generally intelligible type, is often disfigured by careless workmanship and outrageous rhymes. The gentle piety which dis-distinguishes the poetry of Christina Rossetti supplied a want of the time, and met with its due meed of appreciation. The work of Dante Gabriel Rossetti, William Morris, and Swinburne may be classed together. Though the general high quality of their writings is indisputable, the remoteness in choice of subject is such as can appeal only to the cultured reader.

The modern essay has been finely cultivated by Leigh Hunt, Lamb, Hazlitt, and De Quincey; history by Gibbon, Macaulay, Hallam, Milman, Freeman, Kinglake, Gardiner, Froude, and Green; art, criticism, philosophy, economics, and sociology by Hume, Carlyle, Ruskin, Arnold, Pater, and many others.

Sir Walter Scott, who was the founder of the Eng. historical novel, issued his last story in 1831. He had found a sedulous, though somewhat dull, imitator in G. P. R. James, who was already in the field, and met with considerable success. Lytton and Beaconsfield both published their first novels in 1827; and Captain Marryat the earliest of his sea stories in 1829. After Scott, the next writers to give distinction to Eng. fiction were Dickens, whose *Pickwick Papers* appeared in 1837; and Thackeray, who though only one year the junior of Dickens, did not achieve much success until the publication of *Vanity Fair* in 1847. After these came a group of women novelists of eminence—the Brontës, George Eliot, and Mrs. Gaskell. It is impossible even to mention by name in this place the many writers who were once highly popular, but it may be observed that Anthony Trollope, Charles Reade, Charles Kingsley, and perhaps Wilkie Collins, have still their admirers. Robert Louis Stevenson combined fine style and imagination. George Meredith and Thomas Hardy have created new schools of fiction, and there is at present no evidence to suggest the possibility that their best work will be surpassed, or even equalled, in the immediate future.

Twentieth cent. Eng. literature shows the contest between romance and realism in poetry, fiction and drama; witness, *e.g.*, Rudyard Kipling. The cult of realism has led to the identification of literature with sociology and politics. This is seen in the works of Hardy (to some extent), H. G, Wells, G. B. Shaw, and Arnold Bennett.

ENGLISHRY, LAW OF, legal term used under the Norman kings referring to proof of Eng, birth. If a man was slain, unless he was proved to be Eng., the *hundred* was compelled to pay a fine or produce the murderer.

ENGLISH, THOMAS DUNN (1819-1902), American writes and politician. *B.* in Philadelphia, June 29, 1819; *d.* at Newark, N. J., April 1, 1902. He graduated from the Medical Dept. of the University of Pennsylvania in 1839 and after practicing for some time, he began the study of law and was admitted to the bar in 1842. From 1844 to 1855 he was engaged in journalism in New York City, editing for a time The Aristidean. In 1852-1859 he lived in Virginia and then practiced medicine in New Jersey. A member of the N. J. Assembly 1863-1864 he was elected to Congress 1891-1895. He is best known to the general public of to-day as the author of the verses 'Ben Bolt', which set to music became popular song. He was a prolific contributor to periodicals and his books include 'American Ballads' 1882; 'Jacob Schuyler's Millions' 1886 and 'Select Poems', 1894.

ENGLISH, WILLIAM HAYDEN (1822-1896), American statesman, historian and financier. *B.* at Lexington, Ind., August 27, 1822; *d.* in Indiana, February 7, 1906. Educated at district school and Hanover College, Indiana. He was admitted to the bar at the age of 18 but after practicing for a few years he obtained government employment in Washington and never returned to the law. Before reaching his majority, he was a delegate to the Indiana State Convention and stumped for Harrison and Tyler and for his services was made postmaster of Lexington. He held various political offices and in 1851 was elected to the State Legislature and in the next year to Congress, being re-elected three times. In the Civil War while declining the command of a regiment he was active in the Federal cause. He founded the First National Bank of Indianapolis of which he was president for fourteen years. At the National Democratic Convention, Cincinnati, in June, 1880, he was nominated for vice-president on the ticket with General Hancock, Publications 'The Conquest of the Northwest', 'History of Indiana' and 'Life of George Rogers Clark.'

ENGRAVING, primarily the art of drawing on a substance by means of an incised line. The term was early applied to the work produced by that process and later to the impression of the engraved work upon a sheet of paper. This article deals with E. on metals. For a further knowledge of the art the reader is referred to wood-engraving, process, photogravure, mezzotint, and etching. From very early times gems have been engraved with ornaments or signets, and commemorative inscriptions have been cut into metal tablets, but technically the word E. is confined to the incision of a design upon a plate of metal or a wooden block, for the purpose of producing upon paper by the aid of ink a series of reproductions of that design. On metals, Es. are usually in intaglio, that is, the lines are sunk in and possess a positive value in that they actually trace the design. In woodcuts the lines are negative, their object being to leave the true design projecting in relief. Copper and steel are the favourite metals of engravers, but zinc, brass, silver, and iron have also been employed. Steel is much harder to work with than copper, but on the other hand its very toughness makes it possible to take off a greater number of good impressions. By means of electrolysis, it is now open to the engraver to protect his copper plate by a thin coating of steel; the result of this has been almost to do away with steel plates altogether. Copper has always been preferred where the aim of the artist is to produce a highly finished and delicate reproduction of the design.

'Line E.' implies the use of a tool called the graver or burin. This consists of a steel rod some 4 in. long, with a square or lozenge-shaped section, a sharp edge being secured by cutting the section obliquely. The engraver controls the rod by grasping a wooden handle, and in making his strokes, varies the pressure in accordance with the thickness of the line desired. When his work is finished he covers the plate with printer's ink, presses it into the incisions by the aid of a dabber, rubs away the superfluous ink with a piece of muslin and then carefully lays a sheet of moistened paper on the engraved surface. The plate, with the paper thus attached, is placed on a board which slides between two rollers in what is called the copper-plate press. Blankets soften the contact of paper and roller. 'Etching' involves the use of a mordant to eat into the plate. An etching-ground is spread over the copper surface and the lines are opened up with an etching needle. 'Dry-point' is a method of E. akin to the processes already described. The implement used is a steel point stronger and more tapering than the etching needle. When this is firmly drawn across the metal surface, quite a distinct burr—like a miniature thorn—is produced, the effect of which is to leave a semi-luminous ridge of tone at the side of each line, and thus to impart to the whole print an attractive richness of tone. Skilful engravers often blend these three processes in the one plate.

'Tone-processes' aim at achieving a result on the plate similar to that produced by a colour wash in painting. If the artist uses the 'crayon or chalk manner,' he first perforates his etching-ground with special needles like the mace-head or roulette, his aim being to suggest the rough texture of crayon strokes. If he follows the 'stipple method.' he imitates broad tone surfaces by covering the etching-ground with dots and short strokes, using the curved stipple engraver, the drypoint, or the roulette for the purpose. The essential distinction of the 'mezzotint' process, is that the craftsman begins with a dark ground and proceeds to create his lights by a negative and scraping device. With the assistance of a kind of chisel, called the 'cradle' or 'rocker,' he roughens the plate by raising metal points or burrs. At this stage the copper would print a rich black, but the mezzotinter removes the burrs with his 'scraper' in proportion to the tone he wishes to produce. Thus, if he scrapes down to the bottom of the indentation, he will get a smooth surface, which will not be able to hold any ink and will therefore print white. For 'aquatints' the plate is prepared for E. by a porous coating of sand or resinous gum. This method produces Es. not unlike mezzotints.

Not more than twenty-five good mezzotints or dry-points can be obtained from one plate, as the brilliancy of the impression depends on the delicacy of the burr, A steel facing, however, increases the number to a hundred, whilst with this protection as many as three thousand line Es, may safely be taken off. The value of a print depends on the engraver and the fineness of the impression which decreases, naturally. with the number taken. 'Artist's proofs' are treasured, as they bear the signature of the painter or engraver, or of both. The signature is considered a guarantee of the quality of the print and may imply retouchings by the artist.

History of line-engraving and etching.—*Line-engraving*, E, is an art of comparatively recent development and the earliest known illustration, with metal as the medium, is the 'Flagelation,' which is dated 1446, and is the work of a German who lived in the neighbourhood of Cologne or Basle. In Italy the art grew side by side with painting, and arose, as some men think, from that of niello, which was a process of incising a pattern on gold or silver and then filling in the groove with a black compound (nigellum). One of the earliest Italian engravers was Maso Finiguerra *d.* 1464, whose 'Planets' show a great technical advance over the intaglio prints of his predecessors. Considering that printing had only recently been invented, and that paper can hardly have been procurable in large quantities much before 1400, it is, on the whole, very surprising that artists so early conceived and executed the idea of printing designs engraved on copper plates. Finiguerra's work, with its fine lines and plentiful crosshatchings illustrates the 'Fine Manner,' whilst that remarkably fine achievement of the Florentine, Antonio Pollajuolo *d.* 1498, namely 'The Battle of the Nudes,' exhibits the broad and simple lines of parallel shading, which characterises the exponents of the so-called 'Broad Manner,' Somewhat similar in style is 'The Virgin and Child' of Andrea Mantegna *d.* 1506, who worked in

Mantua. Here the outline is firm and the delicacy and nervous power of the artist are nobly expressed. Albrecht Durer, the German, *d.* 1528 Marcantonio Raimondi, the Bolognese *d. c.* 1530, and Lucas van Leyden, the Netherlander *d.* 1533 form a conspicuous triumvirate of engravers. Formal dignity, refinement of touch, and unremitting care are a few of the merits of Durer's portrait of Albrecht of Brandenburg and his 'St. Jerome in the Wilderness.' The influence of this Old Master, who was one of the first to turn to portraiture, was paramount in later centuries, not only in his own country, but also in wider Europe. Marcantonio is famous for his reproductions of Raphael's work. According to Vasari it was the engraver's magnificent 'Death of Lucretia' which was responsible for his long association with that painter. Lucas's skill may well be studied in his 'David playing before Saul.' The first French engraver of note was Jean Duvet *d.* 1561, whose 'Apocalypse' series emphasises his mysticism and at the same time his somewhat heavy, over-loaded style. In England the same distinction must be reserved for William Rogers (*b. c.* 1545), who executed several portraits of Queen Elizabeth, all of which, however, are stiff and too ornate. Professional print-sellers, ready to provide portraits for historians and maps for discoverers, first began to flourish in the latter half of the 16th century. The pioneers were mostly Netherlanders, like Hieronymus Cock and Philippe Galle, many of whom migrated to Italy and Germany and thus popularised commercial Es. abroad. Robert Nanteuil *d.* 1678, who was engraver at the court of Louis XIV., stands easily at the head of all French engravers of portraits, and a similar honour among his own countrymen is with justice claimed for William Faithorne *d.* 1691. In the 'César D' Estrées' the balance and the freedom from mannerism, which Nanteuil always observed in his portraiture, are conspicuous, whilst the vigour and the rather ponderous style of Faithorne are apparent in his portraits of Charles II. In this country John Faber *d.* 1756 made a name as a mezzotint engraver, and one of the last of the great burinists was the painter and poet, William Blake *d.* 1827. There is true inspiration in his 'Illustrations of the Book of Job,' which have, moreover, only rarely been surpassed in purity of line, harmony of composition, and independence of stereotyped convention whether in execution or design. Since Blake's day, etchings and later heliogravures have quite superseded line Es., and the burin, it seems, will soon be a tool of very subsidiary importance.

Etching.—Albrecht Durer was a pioneer in this field and etched his wonderful 'Agony in the Garden,' upon iron. Van Dyck *d.* 1641, who was 'the solitary great etcher,' of the Rubens school, depended for his splendid effects on the use of the open line and vigorous, dotted work, and aimed always at broad effects. Rembrandt *d.* 1669, on the other hand, who is the perfect 'painter-etcher,' relied on close-hatching, and discovered how, by leaving ink on the surface of the copper, he could cope with the difficult task of reproducing the chiaroscuro of his paintings and ensure a rich and liquid surface tone. His etchings embrace portraits, landscapes, and religious themes, 'Christ with the Sick around Him, Receiving little Children,' being widely accepted as his masterpiece. Other and notable painter-etchers of Holland were, Adriaen van Ostade *d.* 1685, Paul Potter *d.* 1654, and Nicolaes Berchem *d.* 1683. In the 18th century the Italian school of etching reached its high-water mark in the delicate 'Capricci' of Giovanni Tiepolo *d.* 1770, and the architectural designs of Piranesi *d.* 1778. A school of satirical etching developed in England. Hogarth *d.* 1835, etched his own paintings, such as the 'Rake's Progress,' whilst Thomas Rowlandson *d.* 1827 illustrated the story of Dr. Syntax and the *Vicar of Wakefield*, and proved himself a brilliant caricaturist. Cruikshank *d.* 1878 may well be mentioned in connection with Rowlandson, as he has won universal favour by his sympathetic interpretation of Dickens's odd characters. Early in the 19th century 1807-19, appeared Turner's *Liber Studiorum*, which contained some excellent plates of his own as well as the etchings of a number of less famous engravers. Francisco Goya *d.* 1828 is the finest Spanish etcher, and in any history of etching his name will always be given a merited prominence. His power to seize upon all hypocrisies and affectations is well exemplified in his 'Caprichos,' whilst his 'Desastres de la Guerra' are remarkable, if almost repulsive expositions of the terrors of war. In the last century the work of Delacroix *d.* 1863, and of Decamps *d.* 1868, did much to revive the art, which in some respects seemed to have grown stagnant. Other notable French etchers were Legros and Meryon *d.* 1868, who has left behind him a beautiful series of Paris plates. But the greatest etcher of the day was probably the American Whistler *d.* 1903, whose charming and exceptionally individualistic work is seen at its best in 'Battersea,' and the 'Venice set.' Modern exponents of the art are, Zorn, the Swede *b.* 1860; Thaulow, the Norwegian; the Englishman, Haden *b.* 1818; and two Germans, von Menzel *d.* 1905 and Max Klinger *b.* 1857.

ENID, a city of Oklahoma in Garfield co., of which it is the county seat. It is on the Atchison, Topeka and Santa Fe and Chicago, Rock Island and Pacific, and the St. Louis and San Francisco railroads. Enid is the center of a large and important agricultural and poultry raising district. It has also extensive industries including the manufacture of flour, lumber, machinery, boilers, brick, steel posts, candy, etc. Here are Phillips University, St. Francis Institute, College of Fine Arts, State Institution of Feeble-minded. There is an excellent school system, a public library, Federal and county buildings, parks and hospitals. Pop, 1920, 16,576.

ENNIS, a city of Texas, in Ellis co. It is on the Texas Central and the Texas Midland railroads. It is the center and trading point of an important agricultural and stock raising region. Its industries include cotton compresses, cotton gins, cottonseed oil mills, railroad shops, flour mills. Pop. 1920, 7,224.

ENNIUS, QUINTUS (239-170 B.C.), one of earliest Latin poets; celebrated as author of the *Annales*, a narrative poem on Rom. history; and a number of tragedies, of which only fragments have been preserved; the *f.* of Rom. epic poetry.

ENNODIUS, MAGNUS FELIX (474-521), bp, of Pavia; wrote an apology for Pope Symmachus and other theological works, being the first to call the Rom. bp. 'papa'; theologically he was *semi-Pelagian.*

ENOCH, in *Genesis*, *s.* of Cain, and also descendant of Seth. There are two Books of Enoch.

ENOCH, BOOKS OF. There are two works with this name; the more important is the *Ethiopic Book of Enoch*; it is quoted in *Jude* 5_{14}, etc., and may be the source of *Matthew* 19_{28}. Its influence on early Christian and late Jewish lit. was considerable. It gradually was forgotten, and lost till the Ethiopic version was discovered in 1773. Its original language was either Hebrew or Aramaic, but which is uncertain. It is certainly composite, and the division of it by R. H. Charles probably as near the mark as any. Chapters 72-82 he assigns to before 130 B.C., 83-90 before 161 B.C., 91-104 to 134-95 B.C., 1-36, a very composite part, earlier than 166 B.C., 37-71 (wherein occurs a remarkable passage in which the Messiah is pre-existent Son of Man) before 64 B.C. *The Book of the Secrets of Enoch* (written partly in G.k, possibly some in Hebrew) exists only in Slavonic trans., written by a Hellenistic Jew in Egypt, 30 B.C. to 70 A.D.

ENOS (40° 42′ N., 26° 5′ E.), town, Adrianople, European Turkey. Pop. c. 7500.

ENSCHEDE (52° 13′ N., 6° 53′ E.), town, Overysel, Holland. Pop. 35,000.

ENSIGN, national, military, or naval flag or banner. Also lowest officers rank in navy. The word is now chiefly applied to a naval flag.

ENSILAGE, preservation of cattle fodder such as hay, in an airtight and watertight chamber (*silo*), in which it undergoes partial fermentation.

ENSTATITE, green mineral of pyroxene group; a silicate of magnesium containing iron oxide and alumina.

ENTABLATURE, term in arch. which includes the architrave, frieze, and cornice.

ENTAIL (Fr. *tailler*, to cut), an estate settled according to the rule of descent, *i.e.* limited to a person and the heirs of his body, general or special, male or female. It is a freehold of inheritance.

ENTENTE CORDIALE, term denoting the friendly relations between France and Britain mainly inaugurated by Edward VII. and M. Loubet in 1903. Anglo-Fr. Convention of 1904 was a corollary, and cleared up many old points of difference. At the Algeciras Conference France, Great Britain, and Russia stood together; and in 1907 (Aug. 31) outstanding Asiatic rivalries with Russia were composed by the Anglo-Russian agreement, thus concluding the Triple Entente, which, as late as Aug. 3, 1914, Sir Edward Grey declared to be not an alliance but a diplomatic group. Believing that in the event of a Ger. attack on France, Belgium would be invaded, Britain in Jan. 1906, sent Lieut.-colonel Barnardiston to open up negotiations with the Belgian military authorities. As an outcome of these, and of other consultations between Fr. and Brit. naval and military experts, the Fr. ambassador was informed by Sir Edward Grey (Nov. 12, 1912) that 'if either government had grave reason to expect an unprovoked attack by a third power or something which threatened the general peace it should immediately discuss with the other whether both governments should act together to prevent aggression and to preserve peace, and, if so, what measure they would be prepared to take in common.' At the same time he reminded the Fr. ambassador that the informal military consultations between the two countries must not be considered binding, Great Britain preserving entire liberty of action. Nevertheless, France thereafter took the possibility of Brit. co-operation into serious account. On Aug. 2 1914, when Austria and Germany were at war with Russia, and France, under the terms of her alliance, was bound to come in, Sir Edward Grey gave an assurance to the Fr. ambassador that 'if the Ger. fleet comes into the Channel or through the North Sea to undertake hostile operations against the Fr. coast or shipping, the Brit. fleet will give all the protection in its power.' This was necessary in view of naval arrangements whereby the British had concentrated their fleet in the North Sea, leaving the Fr. navy to guard the Mediterranean. The Brit. declaration of war against Germany (Aug. 4) did not in itself commit Britain to the dispatch of an expetionary force to the Continent, but the unmistakable trend of public feeling, and the assurance of the Fr. Government that they counted upon military cooperation, made the expedition inevitable. With the dispatch of the British Expeditionary Force the Entente Cordiale may be said to have developed into a definite alliance.

ENTERIC FEVER. See TYPHOID FEVER.

ENTERITIS, inflammation of intestines.

ENTHYMEME, syllogism in which either a premise or the conclusion is omitted; the commonest form of syllogistic arguments in daily life.

ENTOMOLOGY (Gr. *entomon*, an insect; *logos* subject), the science which comprises all the branches of knowledge connected with Insects. The richness of the insect world, with its 250,000 species, renders e. one of the most important of the many branches into which Zoology is divided; and its importance is further increased on account of the harmful activities of many kinds of insects. The study of insect pests is generally termed Economic Entomology.

The Insecta or Hexapoda, are a class of arthropods characterized by the following features: (*a*) The body is segmented, and in the adult is divisible into three regions—the head, bearing a pair of sensory antennae and a number of highly specialized mouthparts; the thorax, to which are attached three pairs of legs (hence *Hexapoda*), and, generally, two pairs of wings; and the abdomen. (*b*) the mode of respiration is tracheal, the tracheae communicating with the exterior by means of special apertures termed stigmata. (*c*) The young invariably differ from the adult in a greater or less degree, and during development undergo slight, incomplete, or complete metamorphosis. In common with the remaining Arthropoda the body secretes an exoskeleton of chitin and the appendages are jointed. Insects constitute by far the largest number of terrestrial animals known, both generically and individually, the rapidity with which many multiply being little short of marvellous. Typically they are either aerial or creepimg in the adult condition, although some (*e.g. Dytiscus*) are aquatic, but many pass a part or all of their larval life in the water.

External Characters.—The head, which contains the so-called 'brain', and also bears the more important sense-organs (eyes, ocelli, etc.), is usually rounded in character and is divisible into two main portions—the *clypeus*, situated between the two antennae and bearing the labrum or upper lip, and the *epicranium*. The mouth-parts consist primarily of three pairs of paired appendages—the mandibles and first and second maxillae respectively—the last pair being fused to form the labium, but in many forms they are highly modified in connection with the suctorial habit. The thorax consists of three segments—namely, the pro-, meso-, and metathorax—each of which bears the wings where these are present. In the Coleoptera the anterior pair are modified as wing-cases (*elytra*), whilst in the Diptera, where only one pair occur, they are mesothoracic, and in some groups (springtails, lice, and fleas) they may be entirely wanting. The wings are outgrowths of the skin and are traversed and supported by nervures, the disposition of which is of considerable systematic importance. The abdomen consists of a variable number of segments—twelve, according to Heymons, being the maximum. They are typically without appendages, but the hinder end often bears stings, ovipositors, claspers, or other specialized structures.

Internal Anatomy.—The alimentary canal consists of three main portions: (*a*) the *stomodoeum*, formed by the mouth, into which the products of the salivary glands pass, the oesophagus, crop, and gizzard; (*b*) the *mesenteron* or true gut, lined by endoderm and possessing a number of blindly ending caecal glands; (*c*) the *intestine*, into the anterior portion of which the excretory organs, termed the Malpighian tubules, discharge. The blood is normally colourless, being mainly nutritive in character. It fills the body cavity and is circulated by the action of a pulsatile heart, surrounded by a pericardial cavity containing fat cells, and continued anteriorly into an aorta, whence it passes into the coelom. The tracheal respiratory system is essentially a system of much-branched tubes, ramifying throughout the body and oxygenating the various parts directly. They are lined internally by chitin, and are supported internally by a closely coiled spiral thread. Each system is connected with its neighbours, and communicates with the exterior by means of a (usually protected) stigmatic aperture. The nervous system is typically invertebrate, consisting of a dorsal, ganglionic mass, united by a circum-oesophageal loop to the ventral nerve chain, which bears a pair of ganglia in each segment. In many forms, however, notably in the Diptera, this arrangement is considerably modified by ganglionic fusions. The eyes may be eihter simple ocelli or elaborate compound structures similar to those of the Crustacea. In addition there occur auditory and other organs, the significance of which is very imperfectly understood. In insects the sexes are distinct, but aphides and certain 'stick insects' are parthenogenetic whilst drone bees are also produced from unfertilized ova. The male sexual organs consist of paired testes opening into vasa deferentia, which are often coiled. These swell posteriorly to form seminal vesicles in which the ripe sperms aggregate and are eventually discharged by way of the ejaculatory duct during copulation. The ovaries are also paired, and consist of ovarian tubules from which the ova are discharged into paired oviducts, these usually uniting posteriorly to form a muscular vagina.

In the majority the life-history is very complex but three main types are distinguishable as follows: (*a*) Those in which the differences between young and adult are comparatively slight and in which the young, after a series of moults, assume the mature form (*e.g.*, *Aptera*, *Orthoptera*, *Hemiptera*); (*b*) those, such as dragon-fly, in which the larva differs considerably both in structure and habits from the adult and is often aquatic; this larva never pupates, but after a period of quiescence sheds its skin for the last time and emerges a perfect insect; (*c*) in the third type the larva also differs markedly from the adult (*e.g.*, maggot, caterpillar), but undergoes a definite, resting, pupal or chrysalid stage during which the larval organs disintegrate and are replaced by those of the adult (*e.g.*, *Hymenoptera*, *Coleoptera*, *Lepidoptera*, and many *Neuroptera*). Such are said to undergo *complete metamorphosis*, as distinguished from the incomplete metamorphosis of the second type. The principal features utilized in the classification of insects are—the absence or occurrence and character of the wings, the structure of the mouth-parts, and the nature of the change from larva to adult; and upon this basis Sharp separates the nine following orders: (1) *Aptera*—springtails and bristletails; (2) *Orthoptera*—cockroaches, grasshoppers, earwigs, locusts, and crickets; (3) *Neuroptera*—dragon-flies, May-flies, caddis-flies, and termites; (4) *Hymenoptera*—bees wasps, ants, and saw-flies; (5) *Coleoptera*—beetles; (6) *Lepidoptera*—butterflies and moths; (7) *Thysanoptera*—thrips; (8) *Diptera*—flies proper; (9) *Hemiptera*—bugs, aphides.

Economic.—Either the adult forms or larvae of many insects are injurious to cereal crops, fruit trees, and numerous other cultivated plants. Where large crops are to be dealt with the only remedy seems to lie in the thorough breaking up of the soil in autumn, the burning of refuse and the encouragement in reason of natural enemies (*e.g.*, moles and birds). In the case of trees and garden crops the treatment will vary with the type of insect; thus in the case of biting insects the food supply is poisoned, whilst suctorial insects are dealt with by contact spraying. There are three chief periods when spraying is useful—namely, winter, late spring, and summer. The object of the winter spraying is to cleanse the plant and to clear out all places where the eggs or young might be hidden. As the plants are dormant, a strong solution may be used, the following being a standard one: sulphate of iron ½ lb., lime ¼ lb., caustic soda 2 lb., paraffin 5 pints, water to 10 gal. April and summer sprayings must be much weaker, their object being to exterminate any larvae which have escaped the previous sprayings. For contact spraying against mealy bugs and the like a solution of soft soap and quassia, or an emulsion of soft soap and paraffin is generally used. Forbiting insects spray the foliage with the following: arsenate of soda 8 oz., lead acetate 1 lb. water 24 gal.

ENTOMOSTRACA, a comprehensive name, under which are generally grouped the more elementary orders of Crustacea, minute creatures living in fresh water or in the sea, and distinguished by the simplicity of their structure.

ENTOZOA. See PARASITES.

ENTRE MINHO E DOURO (41° 30′ N., 8° 20′ W.) old province, Portugal, bordering on Atlantic; area 2790 sq. miles. Cereals, fruits, wine; stock raised. Pop. 1,290,000.

ENTRECASTEAUX, JOSEPH - ANTOINE BRUNI D' (1739-93), Fr.

navigator; famed for his surveys of New Caledonia, Tasmania, and other coasts.

ENTRENCHMENTS are field fortifications constructed in the form of trenches with earth piled up in front to form a parapet; used not only in the defence of a position, but also by troops advancing to the attack. The long range, accuracy, and rapidity of fire of modern weapons render cover much more necessary now than ever before. Entrenchments became an indispensable feature of modern warfare in the Amer. Civil War, and further developments of them took place in the S. African and the Russo-Jap. wars, in the latter of which battles for entrenched positions lasted not only for days but for weeks. An entrenching tool, in the form of a combined spade and pick with a short handle, became part of the field equipment of the infantryman in every modern army, and he was taught how, when lying down, to dig himself in. At the outset of the World War the combatants used only field entrenchments of the shallow shelter-trench type; but more elaborate methods came into use when the Ger. resistance on the heights of the Aisne, in the autumn of 1914, showed that prolonged fighting in entrenched positions would be a feature of the war. On both sides methods of entrenching became so developed that the battle fronts were gradually as elaborately fortified as those of a permanent fortress.

ENTRE RIOS (*c.* 30° 20′ S., 59° W.), province, Argentina, S. America; area, 28,784 sq. miles; rivers, Uruguay, Parana; produces cereals; stock raised. Pop. 1921, 475,236.

ENVER PASHA, Turk. statesman, *b.* Constantinople; was prominent among the Young Turks at Salonica who plotted the revolution of 1908. Denounced by the Sultan Abdul Hamid, he saved himself by flight, and joined Niazi Bey, who compelled the Sultan to grant a constitution. Afterwards he went to Berlin as Turk. military attaché, but returned to Salonica when the counter-revolution came 1909, and took part in the triumphal march to Constantinople and the deposition of Abdul Hamid. In 1910 he paid a visit to London. In 1911, when Italy declared war, he hurried to Tripoli and endeavoured to organize Arab resistance. At the close of the Balkan War of 1912 he headed the movement against the cession of Adrianople to the Bulgarians, and was directly implicated in the assassination of the Turkish commander-in-chief, Nazim Pasha. After the second Balkan campaign 1913 when Bulgaria quarrelled with her former allies (Serbia and Greece) Enver occupied Adrianople at the head of a Turk. army. He became minister of war, with the rank of pasha, in June 1913. He was the leading force in bringing Turkey into the World War on the side of the Central Powers (Nov. 1914), and acted throughout as a military dictator. After Turkey's surrender he fled to Germany, but was heard of with Turkish National Army in Asia Minor in 1923. He was one of the war criminals scheduled for trial.

ENVOY, diplomatic minister inferior to ambassador (*q.v.*); full title is *e. extraordinary and minister plenipotentiary.*

ENZELI, town, Ghilan, Persia (37° 31′ N. 49° 32′ E.), on both sides of the entrance to Lake Enzeli, an arm of the Caspian Sea; the usual port of entrance into Persia, 15 m. N.W. of Resht, and 160 m. from Teheran. It was occupied by the British early in July, 1918, and the occupation continued right down to May 18, 1920, when thirteen Bolshevist warships bombarded the town and demanded its surrender owing to the presence there of Denikin's warships and troops. An armistice was arranged and the British forces evacuated the place.

ENZIO (*d.* 1272), king of Sardinia; hero of many brilliant military exploits in Italy; captured by the Bolognese 1249, in whose hands he remained prisoner until his death.

ENZYMES, colloidal substances produced by living organisms, animal and vegetable, and acting as catalysts. Their compositions have not been definitely determined, none of them so far having been isolated in a pure state. They are soluble in water and sensitive to heat, being in most cases destroyed at a temperature under 100° *c.* The presence of an exceedingly small amount of an enzyme is able to transform an enormous amount of the substance it is acting upon. Thus, invertase, an enzyme present in yeast, can hydrolyze 200,000 times its weight of cane sugar, converting it into a mixture of glucose and fructose. The greater number of enzymes bring about decomposition by means of hydrolysis, and their activities are manifested in presence of an excess of water. Various classifications have been suggested: enzymes acting on starch are termed amyloclastic enzymes, those attacking proteins being named proteoclastic or proteolytic enzymes, etc. Among the more important enzymes are: (1) Diastases, which convert starch into maltose; besides being important in brewing, the pytalin of the saliva which digests starch, transforming it into soluble sugar, belongs to this group. (2) Zymose, found in yeast, able to split up glucose and similar sugars into alcohol and carbonic acid gas, giving rise to alcoholic fermentation. (3) Trypsin and pepsin occurring in the pancreatic and gastric juices, convert the complex proteins into the simpler peptones and amino-acids as food traverses the alimentary canal. (4) Lipase splits up fats. (5) Thrombase coagulates blood.

Like other catalysts, enzymes possess the property of being paralyzed by poisons, and it is probable that, could we discover the secret of their working during the processes taking place in living tissue, some light might be thrown on that complex problem—life.

EOBANUS, HESSUS HELIUS (1488-1540), Latinised name of Ger. humanist of Hesse-Cassel; his Lat. letters and poems were much esteemed.

EOCENE (Gr. *eos*, dawn; *kainos*, recent), name given by Sir C. Lyell to lowest and oldest members of rocks of Tertiary period; contain what Lyell considered first traces of testaceous fauna. He classified the Tertian formations according to proportion of fossil remains that each contained. E. rocks are divided into Lower, and Upper or *Oligocene*; composed of clays, loams, marls and calcareous sandstones, whilst here and there are interspersed layers of a thick and widespread series of limestones and lignite; and found chiefly in the Isle of Wight, S.E. England, on both sides of the Mediterranean, Central Europe, Spain, West Africa and along the Atlantic coast of N. America. Their characteristic feature is the great size coupled with the wide distribution of *Nummulites*—a forminifera organism which apparently flourished in the Eocene seas in vast numbers.

EON DE BEAUMONT, CHARLES GENEVIEVE LOUIS AUGUST ANDRÉ TIMOTHÉ D' (1728-1810), Fr. adventurer; for many years wore woman's dress; diplomatic agent to Russia; in exile, 1765-77; after Revolution lived in England.

EOS the Greek goddess of the dawn (Lat. *Aurora*), *d.* of Huperion and wife of Tithonus.

EOTVOS, JOZSEF, BARON (1813-71), Hungarian writer and politician; composed plays to aid reform movement; Minister of Public Instruction, 1848; wrote *The Influence of the Predominant Ideas of the Nineteenth Century upon the State.*

EOZOON (dawn, and animal), peculiar structures of calcite and serpentine, something similar to Stromatopora and other hydroid corals, found among the early crystalline gneisses and schists of the lower St. Lawrence valle yand the Archaean limestones of Canada. Sir J. W. Dawson 1864, first described them as 'remains of gigantic Foraminifera,' and they were generally held to be fossil organisms. The sesearches of Mobius and others go to prove that they are merely a mineral concretion or segregation of purely inorganic origin. E. has been discovered in rocks of the same age in Bavaria and in limestone blocks hrown from the crate) of Vesuvius.

EPAMINONDAS (*c.* 418-362 B.C.), Theban general; expelled Spartan garrison, 379 B.C.; defeated Spartans at Leuctra, 371, and Mantinea, 362; did much for Thebes politically, and developed military strategy.

EPAULETTE, distinctive shoulder ornament on military and naval uniform coats.

ÈPÉE, CHARLES-MICHEL, ABBE DE L' (1712-89), Fr. ecclesiastic; famed for work as a deaf and dumb educationist.

EPERJES (49° N., 21° 17′ E.), town, Hungary; has Gothic cathedral. Pop. 13,000.

ÉPERNAY (49° 3′ N., 3° 57′ E.), town, Marne, France; champagne centre. Pop. 20,000.

ÉPERNON (48° 37′ N., 1° 39′ E.), town, Eure-et-Loir, France.

EPHEBEUM, hall for the exercise of youths in ancient gymnasiums.

EPHEBI, class of young men in ancient Athens who formed a sort of univ.; they were aged 18 to 20 and under state supervision; institution lasted till III, cent, A.D.

EPHEMERA. See ALMANAC.

EPHESIANS, EPISTLE TO THE, is usually grouped with Epistles to *Colossians*, *Philippians*, and *Philemon*, as the Epistles of the Imprisonment. Its tone is somewhat different from the earlier Pauline Epistles; it is more spiritual, emphasis is laid on Church and family life; the interpretation of the person of Christ and the writer's conception of faith, love, and knowledge are allied to St. John. Some have thought it to be by another hand than St. Paul's, but now the trend of criticism is favourable to genuineness. If genuine it must have been written at either Caesarea or Rome, probably Rome. The words, 'in Ephesus,' in chap. 1. are doubtful, so it may be a circular letter.

In any case St. Paul's style and theology are here more developed; external evidence for it (Marcion and Muratorian Canon) is fairly good.

EPHESUS (*c.* 37° 57′ N., 27° 20′ E.), ancient Ionian city, in Lydia; chief of twelve on coast of Asia Minor; traditionally founded by Carians and Leleges, and taken by Androclus at time of Ionian migration; on N. side of city there was formerly a lake (now a marsh) constituting an inner harbour, outer harbour being formed by mouth of Cayster (the deposits from which were E.'s ultimate ruin).

A little S. of E., on a plain bounded by two hills, stood famous *Temple of Diana* of the Ephesians, built by Chersiphron (a Greek) in VI. cent. B.C. and burnt ('tis said) by Herostratus (to perpetuate his own name) on night of Alexander the Great's birth (Oct. 356 B.C.); restored later, but destroyed by Goths, and only traces of foundations now remain (excavated since 1863); once one of the world's seven wonders and probably largest Gk. temple ever built. Other buildings of which a few ruins are left are the Agora theatre, odeum, stadium, gymnasium, temples of Zeus Olympius and Julius Caesar. E. was conquered in turn by Croesus, Persians, Macedonians, and Greeks; flourished when other Ionian cities were decaying; capital of province of Asia under Romans, and by far the greatest city in Asia Minor; conspicuous also in early Christian history (witness St. Paul's Epistle and Council of E.). E. is now a mere village.

EPHESUS THIRD OECUMENICAL COUNCIL OF., opened (431 A.D.) under presidency of Cyril of Alexandria, with 160 bp's present; condemned the Nestorian heresy, that Christ had two persons besides two natures; Nestorius himself was excommunicated.

EPHOD (Hebrew word, meaning *unknown*), in the 'Priestly Code' is part of the high-priest's official costume; it covered the front, possibly too, the back of the body. It was probably an ancient relic of the cult of Jahweh; may bave been originally a loin cloth, and used in divination. The prophets objected to it.

EPHOR, name of five magistrates of ancient Sparta who became important in VII. cent. B.C.; in some ways they could override the kings; e's were abolished by Cleomenes III. . *c.* 230 B.C.

EPHORUS OF CYME (*c.* 400-330 B.C.), Gk. historian; wrote universal history (29 books) and other works; style very rhetorical.

EPHRAEM SYRUS, ST. (*b. c.* 300), the most famous father of the Syrian Church of IV, cent.; at Council of Nicaea; went to Edessa, then centre of Syriac culture. An ascetic, he devoted himself to writing and teaching. His works, consisting of hymns, homilies, sermons, and commentaries, were written in Syriac. Many are thus preserved, others only in Gk., Lat., Armenian, and Slavonic translations.

EPHRAIM, Israelitish tribe (named after the younger s. of Joseph), dwelling in the central portion of Canaan. Within its territory were Shechem, Samaria, and Shiloh.

EPIC, THE, EPOS, the highest and most dignified form of narrative poetry, usually dealing with great events of past times (hence also called *Heroic*). The *Iliad* and *Odyssey*, attributted to Homer (VIII cent. B.C.), are usually regarded as the first epics, but epic stories were undoubtedly repeated orally long before being reduced to writing. Amongst later Gk. epic writers were Parmenides and Empedocles. The earliest Latin epics were written by Naevius and Ennius. These were followed by the greatest of Rom. epics, the *Aeneid* of Vergil 70-19 B.C. Later epic poets of eminence were Lucan and Statius. Other famous epics are *Beowulf* (Old Eng.), the *Chanson de Roland* (mediaeval Fr.), *Nibelungenlied* (Teutonic) the *Mahabharata* (Ind.), Tasso's *Jerusalem Delivered*, Ariosto's *Orlando Furioso*, Dante's *Divina Commedia*, Camoen's *Lusiads*, Milton's *Paradise Lost*, Spenser's *Faerie Queene*. Among mock-epics may be instanced Butler's *Hudibras*.

EPICHARMUS (*d.* 450 B.C.) Gk. comic dramatist; *b.* Cos; celebrated writer of the Dorian school, many of whose subjects were drawn from the Sicilian life of his day; survives only in fragments; highly esteemed by Plato.

EPICTETUS, Stoic philosopher of the I. cent. A. D.; a slave in Rome, afterwards freed, When Domitian expelled the philosophers from Rome he settled and taught in Epirus. His philosophy was predominantly ethical and religious, its main tenets being the care of God for man, the indifference of all social distinctions, andthe dependence of man's happiness upon his will.

EPICURUS AND EPICUREANISM. Epicurus (341-270 B.C.), though an Athenian, was probably *b.* in Samos. In 307 he settled in Athens, and there formed a society of friends, whose central meeting-place was a garden in the town. The decay of the free city-state naturally led to concentration of thought upon the interests of the individual and to separation of ethical from political theory. The ethical dotrine of E. was hedonistic; welfare consists in pleasure and in pleasure alone. But, unlike the Cyrenaics, he urged his friends to have regard, not only to the pleasant moment, but to the pleasure of life as a whole; to estimate, therefore, the pleasures of the mind and of friendship above those of the body; and to prefer calm to violent excitement. Far from being 'epicures,' the members of the society (at any rate in its earlier days) led a frugal and abstemious life. In physics E. maintained a crude form of atomism; in metaphysics a crude materialism, with which he inconsistently combined a belief in freedom of the will.

EPICYCLOID, curve generated by a point on the circumference of a circle rolling externally on a fixed circle, both circles being in the same plane. Curve has n cusps if radius of fixed circle is n times that of rolling one.

EPIDAURUS, name of two ancient Gk. cities.—(1) Epidaurus the Holy, city on E. coast of Argolis, with natural harbour in N. and open bay in S.; possessed fertile territory surrounded by sea and hills; origin ascribed to Carian colony; later occupied by Ionians, then by Dorians. Objects of interest include: image of Athena in Acropolis; shrine of Aphrodite; temples of Dionysus, Artemis, and Hera. The *Hieron* (Sanctuary) of Asclepius, 8 miles inland, an ancient place of pilgrimage for the sick, has been excavated, and precincts (with magnificent theatre, stadium, baths, gymnasium, and hospital) have been cleared; sacred road from E. lined with tombs. (2) Epidaurus The Hungry, city of Peloponnesus, E. coast of Laconia; founded by (1), and abandoned id Middle Ages; now in ruins.

EPIDEMIC, any disease affecting for a time numbers in one locality, *e.g.* measles, smallpox, diphtheria, scarlet fever, whooping-cough, influenza. Endemic Disease is one continually present in a district, *e.g.* cholera in parts of India.

EPIDERMIS, See SKIN.

EPIDOTE, mineral of same group as garnets, composed of silica and alumina; partially transparent and of foliated or granular structure; colour; green, grey, or yellow usually, but some varieties red or black; found in Scotland and many other localities associated with gneiss.

EPIGASTRIUM, a division of abdomen, the pit of the stomach.

EPIGLOTTIS. See LARYNX.

EPIGONI (classical myth.), descendants of the Seven against Thebes who, ten years after the death of their fathers, marched against Thebes and destroyed the city.

EPIGRAM, the terse and happy expression, in prose or verse, of a single thought or subject; usually accentuated in verse by a striking conclusion. The Greeks and Latins (especially Catullus and Martial) were famous epigrammatists; and in modern times the French, Germans, and English and other nations have cultivated the art. Pope, in particular, was celebrated for his epigrams in verse.

EPIGRAPHY, the classification and elucidation of inscriptions.

EPILEPSY, term applied to a nervous affection, characterised by sudden spasmodic attacks of unconsciousness usually accompanied by convulsions, there being three varieties, *grand mal*, *petit mal*, and *Jacksonian epilepsy*. About a quarter of the cases begin before the age of 10 years, and about three-quarters between the ages of 10 and 20. Children in whose families there are histories of nervous disorders, insanity, alcoholism, etc., are especially liable to be affected, and the exciting causes include practically any cause of undue nervous irritation. In *grand mal* there are two stages, the first termed the *aura*, a peculiar, feeling, taking different forms, experienced by the individual previous to an attack, and warning him that it is coming on, while at the second stage a piercing and characteristic cry is uttered and the person falls down suddenly unconscious. The head is turned to one side, the face first pale and then livid, the pupils dilated. Later, about half a minute afterwards, convulsions come on, the tongue may be bitten, the face is purple, with the eyes protruding, and the breathing difficult. The convulsions usually pass off after a few minutes, the person becomes comatose and then falls asleep naturally.

In *petit mal* there is usually sudden unconsciousness, but there may be only slight giddiness and there are no convulsions. After an attack, however, the mind may be somewhat affected for a time, and the person may perform actions—even criminal actions have been known—of which he is afterwards unconscious.

E. must be distinguished from hysteria, from convulsions in uraemia, and from unconsciousness due to apoplexy, drunkenness, etc.

EPILOGUE, address in prose or verse at end of play by way of explanation, or to crave indulgence. It was employed by Shakespeare and his contemporaries, but was most used in age of Dryden and his immediate successors.

EPIMENIDES (VI. cent. B.C.), famous Cretan poet and prophet.

EPINAL, fort. tn. Vosges, France (48° 10′ N., 6° 26′ E.); chief industries, brewing, weaving and printing; has library with many valuable old MSS. Occupied by Germans on Oct. 12, 1870; but during the World War they were held at arm's length, though they made (autumn, 1914) persistent and unavailing efforts to reach it. Pop. 30,000.

EPINAY, LOUISE FLORENCE D'ESCLAVELLES D' (1726-83) Fr. authoress; noted for intimacy with Rousseau and Baron von Grimm. She wrote *Conversations d'Emilie* and *Memoires*,

EPIPHANIUS, ST. (315-402), bp. of Constantia (Salamis), in Cyprus; a vigorous and narrow Father; wrote *Ancoratus* (Anchor of Faith) and *Panarion* (Drug Chest); learned and honest, but untrustworthy authority.

EPIPHANY, FEAST OF (Gk. *epiphania* from *epiphainein*, to show forth), kept Jan. 6, twelve days after Christmas (whence *Twelfth Day*), commemorates the showing of Jesus to the Magi; is first alluded to by Clement of Alexandria as observed by the Basilidians of Egypt, *c.* 194 A. D, It was probably 'taken over' by the Church from the Egyptian festival of the blessing of the Nile on the same date. It came to be the festival of the Baptism of Christ; as this idea had an Adoptionist and Ebionite coloring E. was observed rather as Christ's birthday, which only later was put on Dec. 25. Epiphanius at first believed Jan. 6 was the day of Christ's 'Birth after the flesh,' though he afterwards adopted the view that Dec. 25 was really His birthday. In 385 Jan, 6 was observed as Christ's birthday in Bethlehem—witness the old Jerusalem lectionary. In the Oriental churches E. still retains its early connection with baptism and the blessing of the waters, *e.g*, in the Armenian Church children are generally baptized then, but in the West its original meaning has been overlaid.

EPIPHYTES, plants whose roots attach to other plants; may have aerial roots also, *e.g.* aroids and orchids.

EPIRUS, EPEIRUS (40° N., 20° 30′ E.), mountainous region in N. W. of ancient Greece; bounded by Illyria, Macedonia, Thessaly, Arcadia, Ambracian Gulf, and Ionian Sea; principal mts., Acroceraunii and Pindus; chief rivers, Celydnus, Acheron Thyamis. E.'s best known ruler was Pyrrhus; Republic established *c.* 200 B. C., but overwhelmed by Romans, 167; peopled mostly by Albanians since 1400; Turkish since 1468, except S. E. strip (Arta) assigned to Greece, 1881; invaded by Greeks in Turco-Balkan War, 1912.

EPISCOPACY.—The origin of E. in Christian Church is a much vexed question over which Catholic and Prot. divines have disputed. It seems possible that the bishops and presbyters of New Testament times were identical; the threefold ministry of the Church was probably not there at first, though when a clear system is developed it is that which is found. By the time of St. Ignatius we reach monarchical E. The essential nature of E. is asserted by Catholic theologians, Rom., Gk., or Anglican. The Amer. Methodist, Protestant Episcopal, the Swed. Lutheran, the Moravian, and Hungarian Unitarian Church possess forms of E.

EPISCOPIUS, SIMON (1583-1643), Dutch theologian; prof, at Leyden; follower of Arminius; banished at Synod o) Dort, 1618, but returned, 1626,

EPISODE, part of a Gk. tragedy coming between choric songs; in modern use, means an interesting story or incident introduced into a longer narrative.

EPISTAXIS, bleeding from the nose, due either to local or general causes, may be stopped by grasping firmly the sides of the nose between the finger and thumb, or by applying ice externally, or cotton soaked in alum or turpentine internally up the nostrils or by plugging the nostrils.

EPISTEMOLOGY, theory of process of knowing,

EPISTLE, a formal kind of letter; compositions addressed by the Apostles to the Romans, Corinthians, Galatians, and others; portion of Scripture appointed to be read in churches. The literary e. was largely cultivated by the ancients. Verse e's were popularized in France by Marot, Boileau, Voltaire, and others. The form was also frequently used by Eng, poets, from XVI. to XIX. cent's.

EPISTYLE, Gk. name for the architrave in architecture.

EPITAPHS, inscriptions on, or for, a tomb. The earliest which have survived have been found on the coffins and tombs of the ancient Egyptians. The

Greeks and Romans also made considerable use of the e. In England it has been popular from very early times. For a long period Latin was the language most commonly used. The e's written by Pope, Goldsmith, William Browne, and other poets have considerable literary merit. Shakespeare's e, runs:

'Good frend, for Jesus sake forbeare,
To digg the Dust encloased heare:
Bleste be the Man that spares thes stones,
And curst be he that moves my bones.'

On Jonson's tomb is inscribed:
'O, Rare Ben Jonson.'
On that of Keats:
'Here lies one whose name was written in water.'

Amongst famous mock-epitaphs may be quoted that by Garrick on Goldsmith:

'Here lies Nolly Goldsmith, for shortness called Noll,
Who wrote like an angel, but talked like poor Poll.'

That written by the Earl of Rochester on Charles II. is well known:

'Here lies our Sovereign lord the King
Whose word no man relies on;
Who never said a foolish thing
And never did a wise one.'

EPITHALAMIUM, bridal-song, of which the finest examples are by Theocritus, Catullus, and Statius; some of the Fr. and Ital. poets; Spenser and other Eng. poets.

EPITHELIUM, cell-tissue, forming the cuticle on the skin, and lining the intestines, bladder, etc.

EPIZOA, parasitic crustaceans of order *Copepoda*; fish-lice.

EPIZOOTICS, the study of parasites living on human beings.

EPODE, a lyric poem; in early Gk. poetry it followed the strophe and antistrophe.

EPONA (classical myth.), Rom. protectress of horses.

EPONYM, mythical founder of a race, *e.g.* Romulus of Rome, Tros of Troy.

EPPING, mkt. tn, Essex, England (51° 42′ N., 0° 7′ E.), on N. outskirts of Epping Forest; 5,300 ac., preserved by city of London and open to public since 1882. Pop. 4,200.

ÉPRÉMESNIL, JEAN JACQUES DUVAL D' (1745-94) Fr. politician; deputy of the nobility to Constituent Assembly; at first held republican views, but later supported the monarchy; guillotined.

EPSOM (51° 20′ N., 0° 16′ W.), town, Surrey, England; has medicinal springs. Epsom Downs have famous racecourse (where the 'Derby' and 'Oaks' are run). Pop. 20,000.

EPSOM SALTS, MAGNESIUM SULPHATE (MgSOf.7HfO), is obtained from dolomite or magnesite by the action of sulphuric acid, or by purifying the native sulphate; also occurring dissolved in mineral waters, *e.g.* at Epsom and Seidlitz. A valuable saline purgative, especially for children, in constipation associated with liver disorders or in dropsy.

EPSTEIN, JACOB (1880) sculptor; *b.* New York City of Russian Polish parentage. He became a resident of London after studying his art under Rodin in Paris. He developed a conception of sculpture, which departed from the Grecian and in its varied realism was a revolt against the general acceptance of Hellenic forms as models for modern art. A series of figures he executed in 1907-8 for the British Medical Association building in the Strand evoked strong criticism, notably from religious bodies, but they also had their defenders. His other work included the tomb of Oscar Wilde in Pere Lachaise Cemetery, Paris, carved in Derbyshiremarble, and decorative sculpture round Church Square in Pretoria, Transvaal.

EPWORTH LEAGUE, a world-wide denominational society of young people affiliated with the Methodist Episcopal Church. It was formed in 1889 at Cleveland, Ohio. Its aim is to stimulate intelligent and loyal piety among young members of the Church, aid them in the attainment of purity of heart and constant growth in grace, and train them in works of mercy and help. The League is controlled by a board partly appointed by the bishops and partly elected by the General Conference districts. It is the largest society of the Methodist Episcopal denomination. In 1919 it had an enrollment of 712,067 members, of whom 373,498 were in the United States, The league has chapters in India, Mexico, South America, Italy, Norway, Sweden, Denmark, Finland, China, Japan and Hawaii. Its official organ is the Epworth Herald, published in Chicago.

EQUATION.—An equation is simply a statement of equality between two algebraic expressions. E.'s are of two kinds—(i) *identities*, and (ii.) e.'s of *condition*. See ALGEBRA.

EQUATION OF TIME refers to the difference between mean and apparent solar time, caused by the fact that the sun moves at a varying rate. The everyday unit of time is that of an imaginary sun moving at the average rate of the real sun. Mean and apparent noon differ by a varying amount known as the equation of time. In the *Nautical Almanac* this equation is given for every day in the year. Four times in a year—on or about April 15, June 15, Sept. 1, and Dec. 24—the equation is zero, since on those occasions apparent and mean noon coincide.

EQUATOR, imaginary line drawn round center of earth's surface; divides earth into N. and S. hemispheres; latitudes are measured from the e., its own latitude being 0°. Celestial Equator is the great circle of the heavens coinciding with plane of earth equator; also called *The Equinoctial*, because, during sun's crossing of it, day and night are exactly equal in length.

EQUILIBRIUM, in mechanics, is the state of rest of a body under the action of two or more forces. The E. may be *neutral, stable*, or *unstable*.

Neutral equilibrium.—If a body or a material system is balanced by the forces which act upon it in any position in which it may be placed, its E. is *neutral*. This is the case with a sphere or a circular cylinder of uniform material placed on a horizontal plane. Any body whose center of gravity is at the fixed point of support, or is always at the same height above the point of support, is in neutral E.

Stable equilibrium.—But if when the body is displaced very little in any direction from its E. position and left to itself it commences and continues vibrating without ever experiencing more than very small deviation from the position of E., the E. is said to be *stable*. This is the case with a pendulum, or with a sphere loaded in its lowest part.

Unstable equilibrium.—If, on the other hand, the system can be displaced in any way from a position of E., so that when left to itself it will not vibrate within very small limits about the position in E., but will move farther and farther away from it, the E. is said to be *unstable*. Thus an egg or a billiard cue standing on end presents a case of unstable E. In many cases the E. varies with the direction of displacement; but if it is unstable for any possible displacement, it is practically unstable on the whole. Thus a coin standing on its edge is in neutral E. for displacements in its plane, but is in unstable E. for those perpendicular to its plane. It is, therefore, practically in unstable E.

The *conditions* required for E. vary according to the number of forces and according as the forces are acting in the same plane or not. Thus *two co-planar forces* can only balance when they are equal in magnitude and directly opposed to each other. *Three co-planar forces* acting at a point will be in E. if they can be represented in magnitude and direction by the three sides of a triangle taken in order.

EQUINOCTIAL, see EQUATOR.

EQUINOCTIAL GALES, a popular superstition to which science lends no support. Winds and storms are not more prevalent at the equinoxes than at other seasons.

EQUINOX, a term used in astronomy to denote either one of the two points at which the sun in its apparent annual course among the stars crosses the equator. It is so called because the days and nights are nearly equal, when the sun is at these points. The vernal or spring equinox occurs about March 20th; the autumnal equinox occurs about Sept. 23rd. When but one equinox is referred to, the vernal equinox is meant.

EQUINOXES (from Lat. *aequus*, equal and *nox*, night) are the two days in the year, March 21 and Sept. 22 when the days are equal to the nights all over the world. Owing to the inclination of the axis, on which the earth rotates, as it journeys round the sun, the portion of its surface which is lightened by the sun's rays, the circle of illumination that is, varies, but at the E. the sun apparently describes the equatorial circle and exactly half of each parallel is illuminated. At the vernal E. (in March) the sun passes from S. to N., which results in the days lengthening in the northern hemisphere, and from N. to S. in the autumnal, when the days shorten.

EQUITES (or 'knights;' Lat. *equus*, horse) an ancient Rom. order, originally military, then political. In Republican times they were (1) the *equites equo publico* (only patricians), who were furnished with horses; (2) *equites equo privato* (patrician and plebian), enrolled volunteers; (3) 12 squadrons (100 each) of plebeians. Gradually the order took less part in military affairs and became financial and plutocratic, as against the senatorial aristocracy. All who had 400,000 sesterces were at length called *equites*. C. Gracchus gave them the power over juries, and the taxes of Asia; and to him the equestrian order also owes, probably, the privilege of wearing the senatorial gold ring. Cicero got their help in crushing Catiline's conspiracy, and it was his favorite idea to unite them with the Senate. Augustus reconstituted them on a military plan. After Constantinople became the Imperial capital, they practically ceased to exist.

EQUITY, the system in law of a supplemental law, administered in certain courts. It is founded on defined rules, precedents, and established principles. Judges have considerable latitude in expounding the law of equity and developing it to meet new conditions. While equity aims to assist the defects of the common law by extending relief to those rights of property which the strict law does not recognize and by giving more ample redress than are afforded by the ordinary tribunals, equity in no manner either controls, modifies, or supercedes the common law. It rather guides itself by its analogies and does not assume any power to subvert the doctrines of the common law. Equity courts grant redress to all parties where they have rights and modify and fashion that redress according to circumstances. They bring before them all the parties interested in the subject matter of the suit and adjust the rights of all.

EQUIVALENT PROPORTIONS, LAW OF. See CHEMISTRY.

ERA. See TIME.

ERASMUS, DESIDERIUS (1466-1536), Dutch scholar and theologian; *b.* Rotterdam; natural *s.* of Rogerius Gerardus; ed. in monastic schools at Bois-le-Duc and Delft; became sec. of bp. of Cambrai, and pursued his studies at the College Montaigu at Paris. In 1498, at the instance of Lord Mountjoy, he paid a visit to England, studied Gk. at Oxford, and formed a close friendship with Sir Thomas More. He did not remain long in England on this occasion and several years following were spent in Paris, Orleans, the Netherlands, and in Italy, where he made the acquaintance of the Venetian printer, Aldus Manutius, and became, for a while, tutor to the abp. of St. Andrews, *s.* of James IV. of Scotland. He spent the years 1509-14 in England, acting as Lady Margaret prof. of Divinity at Cambridge. The latter part of his life was spent at Basel. His publications include *Adagia*, the *Enchiridion Militis Christiani*, *Encomium Morioe* (Praise of Folly), *Colloquia*, *Spongia*, *Diatribe de Libero Arbitrio*, *Ciceronianus*, and numerous other works; of these the best known is his famous satire, the *Praise of Folly.* Having taken priest's orders while employed by the bp. of Cambrai, E. remained faithful to the Church of Rome throughout his life, but this did not prevent him from criticising with great severity the vice and ignorance of the clergy, which attacks caused him to have many enemies. His writings were marked by perfect sanity and broadness of view, and his influence was very widespread both as critic and theologian. E. was perhaps the greatest figure of the Renaissance.

ERASTUS, THOMAS (1524-83), theologian of Heidelberg and Basel; opposed political conceptions of Church which gave it coercive power apart from State; gave his name to *Erastianism* though differing from it, not really subordinating Church to State.

ERATOSTHENES OF ALEXANDRIA (*c.* 276- *c.* 194 B. C.), Gk. astronomer and scientist; *b.* Cyrene; superintendent of Alexandrian library; computed earth's circumference; *d.* by voluntary starvation.

ERBACH (49° 40′ N., 9° E.), town, Hesse-Darmstadt, Germany.

ERBIUM (E—166), rare metal found in gadolinite; salts, rose-colored, have a peculiar spectrum.

ERCKMANN, EMILE (1822-99), and **CHATRIAN LOUIS GRATIEN** (1826-90), Fr. novelists who collaborated in writing popular military stories and plays, including *Le Juif polonais.*

EREBUS (classical myth.), *s.* of Chaos, and bro, of Nox; also the gloomy region adjacent to Hades.

ERECH, old Babylonian city, from ruins of which many important inscriptions have been excavated; noted for temple of Ishtar.

ERECHTHEUM, temple of Acropolis of Athens; fine specimen of Ionic order; plan is peculiar—probably designed to include several adjacent sacred spots: Cecrop's tomb, Poseidon's trident, and olive tree sacred to Athena; date of building uncertain; used as church in Middle Ages; now being restored.

ERETRIA (38° 24′ N., 23° 48′ E.), ancient town, Euboea, Greece; modern Aletria; taken by Persians, 490 B. C.; ruins of theater remain.

ERECTHEUS, legendary king of Athens, sometimes identified with Erichtonius; connected in legend with Athena, and with a snake; killed by Poseidon.

ERESHKIGAL, Babylonian female deity of lower world.

ERFURT (50° 59′ N., 11° E.), town, Prussian Saxony, on Gera; has famous cathedral (begun XII. cent.) and other fine old churches; Augustinian monastery (now orphanage), where Luther was friar; univ., 1392-1416; chief industries: boots, shoes, mantles, woolen and cotton goods, chemicals, machines, musical instruments, leather, brewing, dyeing, and royal rifle factory; Congress of E., 1808, between Napoleon and Alexander I. of Russia. Pop. 110,000.

ERGOT, condition of the ovary of various grasses, and especially of rye, produced by a stage in the growth of a fungus. The grains which are obtained in this condition from rye, are dark, curved, with two furrows up the sides, and a disagreeable and distinctive taste and smell. They are used internally as a drug, contracting the muscular walls of arteries and of the uterus.

ERIC XIV. (1533-77), king of Sweden; succ., 1561, and *m.* a soldier's dau.; became mad and was deposed, 1568, his bro. Charles being proclaimed king.

ERICACEÆ, sympetalous dicotyledons growing characteristically on peaty soil; usually low shrubs, but some, such as *Erica arborea*, are tree-like. The leaves are often very narrow, owing to their edges being rolled downwards; flowers perfectly tetramerous, as in the Heaths, or pentamerous, as in *Andromeda*, with two whorls of horned stamens.

ERICHT, LOCH (56° 38′ N., 3° 22′ W.), lake between Perthshire and Inverness-shire, Scotland; 14 miles long.

ERICSON, LEIF, son of Eric the Red, is said to have furthered the exploration made by his father in Greenland by discovering Helluland (Labrador†), Markland or Woodland (Nova Scotia?), and Vinland or New England about 1000 A. D. Consult Archibald Williams' *Romance of Early Exploration* (Seeley); Justin Winsor's *History of America, Arctic Exploration and Greenland.*

ERICSSON, JOHN (1803-1889), engineer and inventor; *b.* Wrmland province, Sweden; *d.* New York City. Mechanics attracted him as a boy, especially as related to navigation. He became known as an inventor after serving six years in the Swedish army. Among his inventions were a condensing-flame engine, which he devised in England, where he lived from 1826 to 1839. While there he also designed the caloric engine; appliances for improving naval steam engines; the screw propellor for ship propulsion; a self-acting gunlock which enabled naval cannon to be discharged automatically at any elevation regardless of a ship's rolling; and a high-speed locomotive. The priority of his invention of the screw propellor was questioned, and he lacked adequate recognition from the British Admiralty for his devices. His locomotive, called the Novelty, was an unsuccessful competitor of one invented by George Stephenson, named the Rocket, for a prize offered by the Liverpool and Manchester Railway for an efficient train-engine. In 1839 he came to the United States, and in the same year furnished the engine and screw to the first steam vessel that crossed the Atlantic. His next achievement was the screw-propellor of the warship Princeton, 1841, an innovation which signalized the installation of engines and boilers below the water line and which registered an epoch in naval history in that it led the way to modern naval construction and laid the foundation for the world's steam fleets. In the Civil War he became notable as the builder of the Union ironclad Monitor, whose fight with the Merrimac sealed the fate of wooden navies. His later inventions included the steam fire engine, torpedoes and a torpedo boat, and a solar engine, or a device that could be worked by the sun's heat. There are statues of Ericsson in Battery Park, New York City; Worcester, Mass.; and in Stockholm, Sweden.

ERIDHU, early Babylonian religious center, on shore of Persian Gulf; seat of worship of Ea, the sea-god.

ERIE, a city of Pennsylvania, in Erie co., of which it is the county seat. It is on the Lake Shore, the Pennsylvania, the Erie and other railroads, and on Lake Erie. The streets are well laid out on a high bluff. Its advantageous situation has given it a high rank as a shipping point and manufacturing city. It is the largest landlocked harbor on Lake Erie. This harbor has been greatly improved. The industries of the city include iron, steam engines, machinery, car wheels, stoves, woodwork, petroleum, etc. It has regular steamship connection with other ports on the Great Lakes. The notable buildings include the city hall, Union depot, government building, St Vincent's Hospital, and several private schools. The city occupies the site of a French fort built in 1749. It was the headquarters of Commodore Perry in the War of 1812 and the fleet with which he defeated the British in the battle of Put-in-Bay was built and equipped here. Pop. 1920, 93,372.

ERIE, LAKE, BATTLE OF, an engagement between an American and a British fleet on Lake Erie, on Sept. 10, 1813. The American vessels were under the command of Oliver H. Perry, a naval officer less than thirty years old, who had been sent up to the Lake with a force of sailors and shipbuilders, to build war vessels and man them, to check the efforts of the British then being made to gain control of the Lake, and, through it, of the entire Northwest. By the beginning of September, Perry had nine vessels with 54 guns. The British fleet which sighted the Americal vessels on the morning of Sept. 10, under the command of Captain Barclay, numbered six ships with 63 guns. At first Perry's flagship, the 'Lawrence,' was completely disabled by the concentrated fire of the British guns. Perry, with eight survivors of his crew, had barely time to escape in a ship's boat to another of his vessels, the 'Niagara.' Hoisting his flag from this vessel, he renewed the battle and within half an hour the British were so crippled that they were compelled to surrender. It was the first time that a British fleet had been overcome by the Americans.

ERIE CANAL, THE, a canal extending from Buffalo to Albany, New York, connecting the Great Lakes with the Hudson River; second among the artificial waterways of the world. It was begun in 1817 and completed in 1825. Length 365½ miles; depth 7⅛ to 9½ feet. The value of this canal in the commercial development of the N. Y. state and of New York City as great port it would be impossible to estimate. As early as 1795 some unimportant efforts to build a canal had been made. In 1816 Governor Tompkins urged the State to build a canal and appointed De Witt Clinton (*q.v.*) to head a commission. In Oct., 1819, a section of the canal from Rome to Utica was opened, which in the following year was extended to Seneca Lake. The first canal boat 'The Seneca Chief' made the trip from Buffalo to New York on Oct. 26, 1825. The first cost of the canal was $7,143,789 and by 1836 the State Treasury had received from tolls more than the cost. Changes and adjuncts to the canal were made from time to time. There are some unsavory political stories relating to this waterway when it was exploited by the 'Canal Ring.' After the consolidation of the New York Central and Hudson River R. R.'s the canal was little used for long hauls. Tolls were reduced and then abolished. In 1903 the people voted to enlarge the canal to afford passage for barges of 1000 tons. See NEW YORK STATE BARGE CANAL.

ERIE, LAKE, the southernmost of the five great lakes in the northern United States, between Lake Huron and Lake Ontario. It is bounded on the north by Canada, on the west by Ohio and Michigan, and on the south by Ohio and Pennsylvania. It is 245 miles in length, stretching southwest and northeast, and from 30 to 60 miles in width, including an area of nearly 10,000 square miles. The surface of the lake is 573 feet above sea level and averages from 100 to 200 feet in depth. It is fed by the water from all the other big lakes, except Ontario, through the strait known as Detroit River, and by the Grand, Maumee, Sandusky, Huron and Cuyahoga rivers. Through the Niagara River it has an outlet into Lake Ontario. It is connected with the Atlantic seaboard by the Welland Canal, passing around Niagara Falls, and with the Hudson River by the Erie Barge Canal. Lake Erie is considered the most dangerous of the big lakes, on account of its shallowness, combined with the heavy ground swell sweeping it from shore to shore.

ERIGENA, JOHANNES SCOTUS (*c.* 800-877), mediaeval theologian, forerunner (or one of founders) of scholasticism; *b.* Ireland; controlled Palatine Academy at Paris.

ERIGERON, genus of composite plants, including Fleabane (*E. acris*); flowers resemble asters.

ERIGONE (classical myth.), *d.* of Icarius, to whom she was devoted; hanged herself after his murder.

ERIN, an ancient name for Ireland. The form was originally Eriu, of which Erinn wat the dative case. Eriu later became a dissyllable, Erie. It has been suggested that the word originated from Erie, the wife of MacColl, one of the kings reigning in Ireland at the time of the coming of the Milesians. The name gained popularity through the writings of Moore.

ERINNA, Gk. female epic poet; contemporary and friend of Sappho.

ERINYES, THE, EUMENIDES OR FURIES (classical myth.), three female divinities, Alecto, Megaera, and Tisiphone, chiefly known as the avengers of blood. They were daughters of Acheron and Nox.

ERIPHYLE (classical myth.), the perfidious wife of Amphiaraus, who, bribed by Polynices with the necklace of Harmonia, induced her husband to join the Seven against Thebes, in which expedition he perished.

ERIS (classical myth.), Gk. goddess of discord; *s.* of Ares.

ERITH (51° 28′ N., 0° 12′ E.), town, Kent, England. Pop. 28,000.

ERITREA OR ERYTHRAEA, Ital. colony on Red Sea Africa (12° 30′-18° 2′ N., 36° 27′-43° 8′ E.); coast-line is *c.* 670 m. long, of coral formation and with many islands. Interior consists of two regions—in N., part of Abyssinian plateau; in S., part of Afar country, large tracts of plain, mostly arid and often forming jungle of mimosa trees; principal rivers enter salt basins. Water is scarce. Climate varies: on the coast, excessive heat; in valley-lands, more temperate; on plateau, cool. Seaports are Massowa (cap.) and Assab; good pearl fisheries; valuable salt production; gold near Asmara. Inhabitants are largely nomadic shepherds; Abyssinians, Arabs, Danakil. Eritrea has gradually come into Ital. hands since 1880. Area, 45,800 sq. m. Pop. 406,000.

ERIVAN. (1) Transcaucasian republic recognized by Great Britain in 1920 (40° 10′ N., 44° 30′ E.); an elevated plain culminating in an extinct volcano, Alagoz (13,436 ft.); drained by tribs. of riv. Kura; agriculture; famed for apricots and peaches. Area, 10,725 sq. m.; pop. 1,214,391. (2) Town, in above; has beautiful mosque and Pers. fortress. Pop. 90,000. See ARMENIA.

ERLANGEN (48° 36′ N., 11° 1′ E.), town, Bavaria, Germany; manufactures gloves, stockings, mirrors, beer; has univ., dating from 1732; fine library. Pop. 1919, 23,521.

ERLKÖNIG, ERL-KING (Ger. myth.), evil spirit, supposed to carry away children; subject of ballad by Goethe.

ERMANARIC (fl. 350-376), king of East Goths; won kingdom between Danube and Baltic; overthrown in Hunnish invasion; hero of Norse epic.

ERMELAND, ERMLAND (54° 8′ N., 2° E.), region, E. Prussia, Germany. Pop. *c.* 240,000.

ERMELO, town and district, Transvaal, South Africa.

ERMINE, a name given to the stoat (*Putorius ermineus*) when it puts on its white winter coat. During the summer months the fur is a reddish-brown shading into white underneath, but in the winter turns to pure white. The tail is black. See STOAT.

ERNE (54° 30′ N., 8° 15′ W.), river, Ulster province, Ireland; flows into Donegal Bay; Lough E. (54° 20′ N., 7° 50′ W.), and Upper Lough E. (54° 13′ N., 7° 30′ W.), lakes, County Fermanagh Ireland.

ERNEST I., ERNST ANTON KARL LUDWIG (1784-1844), duke of Saxe-Coburg-Gotha; succ. 1806; f. of E. II. and Albert Prince Consort of Great Britain.

ERNEST II., AUGUSTUS CHARLES JOHN (1818-93), duke of Saxe-Coburg-Gotha; succ. his *f.*, Ernest I.; *b.* of Albert, Prince Consort; supported Prussia in war with Austria, 1866; wrote *Aus Meinem Leben.*

ERNEST AUGUSTUS (1771-1851), king of Hanover and Duke of Cumberland, fifth *s.* of George III.; on death of William IV. succ. to Hanoverian Crown.

ERNESTI, JOHANN AUGUST (1707-81), Ger. philologist and theologian; edit. numerous classical authors.

ERNIE, BARON, ROWLAND EDMUND PROTHERO (1852), Eng. politician and author; ed. *Yuarterly Review* 1894-9. Among his many publications are *Life and Correspondence of Dean Stanley, The Psalms in Human Life, English Farming Past and Present, etc.*

ERNST, OSWALD HERBERT (1842) major general; *b.* near Cincinnati, O. He was a Harvard graduate and trained for the army at the U. S. Military Academy, West Point, specializing in engineering. Gazetted a first lieutenant in 1864 he became captain in 1867, major in 1882, and colonel in 1889 Between 1878 and 1889 his work embraced the conduct of western river improvements and harbor construction in Texas as engineer in chief, the latter project including the deepening of the Galveston harbor channel. From 1893 to 1898 he was superintendent of West Point, meantime becoming a brigadier-general of engineers. In the Spanish American war, in command of volunteers, he led his troops into action at Coamo. He was closely identified with the building of the Panama Canal as a member of the Isthmian Canal Commission and in 1905 joined the board of directors of the Panama Railroad. In 1906 he retired. He wrote works on practical military engineering and on the Chicago river tunnels.

ERNST, RICHARD PRETLOW, (1858), United States Senator. *B.* at Covington, Ky. Educated at Centre College, Kentucky. 1878. Bacheler of Laws of Cincinnati University in 1880. In 1880 was admitted to bar. Has practised law in Kentucky and Cincinnati. 1921-1927 United States Senator from Kentucky. Active in Charitable and Educational works. Trustee of Western College for Women, Ohio. University of Kentucky and Centre College.

ERODE (11° 20′ N., 77° 40′ E.), town, Madras, India. Pop. 15,000.

EROS (classical myth.), Gk. god of love; represented as a beautiful boy; associated with the love of Psyche; called Cupid by the Romans. E. is also name of a minor planet.

EROSION OR DENUDATION. The process by which the surface of the earth is hollowed out, worn down, or changed into new formations. Thus mountains are reduced in height and valleys are carved out in plateau. The general tendency is to level continents to sea level, or base level. Rivers are the most potent and active forces in working changes in the land surface. They destroy and build up. Rain, and melted snow which supply the rivers carry soil and disintegrated rock down the slopes to the valleys and the deposit is left in the channels of the waters, or is carried to the sea. By abrasion the rough substances wear away river floors and banks thus deepening and widening the streams. Rain, sun, frost and the chemical action of the atmosphere, cause erosion of rock formations and remove them. Rivers carry immense quantities of sediment. The proportion is sometimes one part sediment to 300 of water. The Mississippi to the Gulf of Mexico carries over 4,000,000 tons annually of detritus. The Nile brings down over 150,000,000 tons. The sea is another active erosive force, hollowing out, and reducing cliffs and creating bays, etc. Glacier ice also works great changes. The mountains of Nevada and the Rockies, and the northern parts of the United States and the Greater part of Canada were once the seat of ice sheets.

The uneven resistance to erosion is shown in heights and valleys. But what nature destroys she also builds up and what the earth surface loses in one place is gained in another. Thus the sea cutting into the coast at one point piles up the deposit above sea-level at another point.

EROTIC LITERATURE (Gk.*ερως*, love), the name given to that literature which has for its principal subject the passion of love. Human love is, of course, meant, as otherwise practically all literature would come under this heading, being inspired by love of nature, art, etc. Among the erotic poets of Greece the names of Alcaeus, Sappho, Mimnermus, and Anacreon stand out as singers of passionate lyrics, whilst Callimachus and Philetas sang in a more scholastic strain. Nor must the delightful idylls of Theocritus be omitted. In Roman times Petronius was the founder of E. L.; the poets Horace, Ovid, Tibullus, Propertius, and Catullus have all written much beautiful verse, which come into this class. In France in the middle ages we have Conon de Bethune, ages we have Conon de Bethune, Gace Brulé, Bodie, etc., in the 12th and 13th centuries; they were troubadours, and the form of their songs was by no means fixed. In the following century ballads, rondeaux, etc., were introduced, but there is not much talent until the time of the Renaissance. Then we have the voluptuously melancholy songs of Marot, the passionate lyrics of Ronsard, the spiritual strains of Louis Labe, the tender sensuality of J. du Bellay and Jean the Second. The 18th century was the golden age of French E. L., with such men as Gentil-Bernard, Dorat, Bernes, Bertin Conward, A. Chenier, etc. The poetry of the succeeding century embraced too many elements to come under the head of 'erotic' work, though elements of eroticism were in it. In England the time of the Civil War and the Commonwealth produced some of best E.L.; the lyrics of Herrick, Waller, Carew, Suckling, Lovelace, Cowley, etc., all belong to this class. Since then the same may be said as in the case of French literature, though many of Shelley's lyrics might be termed erotic, and of later years much of Swinburne.

ERRATICS, stones which occur in places where existing geological formation does not correspond to their structure; due largely to glaciers.

ERSKINE, HENRY (1746-1817) Scot. lord advocate; famed for his brilliant oratory and wit; also a poet of some distinction.

ERSKINE, JOHN (1879), college professor; *b.* New York City. He was educated at Columbia University, graduating in 1900 and rejoined that institution as assistant professor of English nine years later, after serving meantime in a similar post at Amherst College. In 1916 he became professor of English at Columbia. In the latter stages of the World War he acted as chairman of the Army Education Commission of the American Expeditionary Force and as educational director of the A. E. F., University at Beaune, France. He received the U. S. Distinguished Service Medal and was made chevalier of the French Legion of Honor. As an author he wrote on and edited selected works of Elizabethan and later poets and of Lafcadio Hearn, and was a co-editor of the Cambridge History of American Literature, 3 vols. 1917-19.

ERSKINE, THOMAS 1ST BARON (1750-1823), Brit. lawyer; *b.* Edinburgh;

called to Bar, 1778; notes for several famous defences. Lord Chancellor, 1806-7.

ERVINE, ST. JOHN GREER (1883), British playwright, and author; *b.* Belfast. His plays include The Magnanimous Lover; Mixed Marriage; Jane Clegg, John Fergusom, and The Ship 1922. He was manager of the Abbey Theatre, Dublin, where several of his plays were first produced. Among his novels are Changing Winds, and The Foolish Lovers. In 1922 he published Some Impressions of My Elders, a collection of views on comtemporary writers contributed to the North American Review. In the World War he was a lieutenant in the Dublin Fusliiers and was wounded in action.

ERYSIPELAS, acute infectious disease, characterised by a spreading inflammation of the skin, caused by a *streptococcus*, a form of bacterium, usually invading a slight surface wound of the face. The onset is sudden with rise of temperature, and a red patch soon appears on the skin, spreading in all directions, blisters and pustules forming. The face is swollen and painful, but in a few days the temperature goes down and the skin comes off.

ERYTHEMA, skin-rash due to exposure, irritation, or use of drugs; also found as accompanying symptom in several fevers; treatment consists of cooling ointments, and sometimes antipyretics (drugs which reduce fever).

ERYTHRÆ (38° 20′ N., 26° 30′ E.), ruined ancient city, Asia Minor; modern Litri.

ERZBERGER, MATHIAS (1865-1921), German politician. *B.* at Buttenhaus, Germany, September 20, 1865; shot and killed near Offenburg, Baden, August 26, 1921. Of humble parentage, the *s.* of a poor tailor, he taught school for a time and at the university made a special study of international law and political economy. His political writing and orations attracted attention, and he was elected to the Reichstag in 1903, joining the Centre Party. During the World War he is said to have instigated the proclamation of the 93 intellectuals who gave Germany a clean bill regarding the war, and her manner of conducting it. He created a sensation in 1917 by presenting in the Reichstag the 'July Resolution' demanding peace without annexations. For this move he was never forgiven by the reactionaries. He failed in his appeal to Chancellor Hollweg to reform and liberalize the electoral laws. After becoming chief of the Centre, he was appointed minister without portfolio in the cabinet of Prince Max of Baden. He was one of the delegates sent to arrange for an armistice with General Foch. As the leader of the Majority Socialists he joined the new ministry of the Republic and worked hard to build up a stable government. Various attempts were made to assassinate him which he describes in his book 'Recollections of the War'. After one attack in 1920 he resigned from the cabinet, but was elected to the parliament in June of that year. In 1921 he was accused by his enemies of sending money abroad, and his immunity as a Reichstag member was removed. It was reported that during a speaking tour he had advocated a tax on capital and the confiscation of hoards of gold and silver. After he was killed the Government made many arrests and learned from documents discovered, that he was the victim of a group of reactionaries who were also plotting the 'removal' of other liberals.

ERZERUM. (1) Vilayet, partly Armenian and partly Turkish, occupying centre of the Armenian plateau, and containing sources of Euphrates, Choruk, and Aras (Araxes); agricultural and forest country, with iron, saline, and sulphur springs, salt and coal. Area, prior to World War, 19,600 sq. m.; pop. 645,700. (2) Cap. of above (39° 55′ N., 41° 17′ E.), at E. end of plain watered by Kara-su (W. Euphrates), 6,000 ft. above the sea and frequently snow-bound for six months in the year. Pop. 80,000. A place of great antiquity, it occupies the site of the citadel founded (5th cent.) by Byzantine emperor Theodsius the younger as an outpost of empire; fell into hands of Turks 1519; occupied by Russians 1829; invested by them 1877, and restored to the Turks after Treaty of Berlin 1878; formerly important trading centre, and the strongest fortress in Turk. dominions. Defences on Deve Boyun ('neck of the camel'), heights E. of the town, reorganized by Germans on outbreak of Great War, were carried by Russians (Feb. 15, 1916), and on following day citadel was occupied, with great booty; retaken by Turks early in 1918; seized by Georgians and Armenians, and later occupied by troops of Mustapha Kemel Pasha from Constantinople.

ERZGEBIRGE (50° 40′ N., 13° 40′ E.), mts., between Saxony and Bohemia; highest peaks, Keilberg 4072 ft., Fichtelberg 3980 ft.; produce lignite, silver, lead, etc.

ERZINGAN, ERZINJAN (39° 40′ N., 39° 50′ E.), town, Erzerum, Turkey in Asia; has copper, cotton, and silk manufactures; thermal springs. Pop. *c.* 20,000.

ESAR-HADDON, king of Assyria, reigned 681-668 B.C.; succ. Sennacherib; overthrow of Tyre accomplished by him and his successor Asshur-bani-pal.

ESAU, in *Genesis, s.* of Isaac and *b.* of Jacob, by whom E. was robbed of his birthright.

ESBJERG (55° 28′ N., 8° 25′ E.), port W. coast of Jutland, Denmark. Pop. 18,000.

ESCALATOR, an upward moving stairway, used instead of an elevator. It consists of a series of steps moving on an endless belt, from twenty inches to eight feet in width, revolving around wheels above and below, traveling along an incline of about the same angle of ordinary steps 45 degrees. The speed is about two feet per second. The device was first employed at the stations of the New York Elevated Railroad, in 1900, and has since been adopted by all the large department stores. The advantage of the escalator over the elevator is that it works continuously and can, therefore, handle a much large crowd than an elevator, but it has been found impractical for greater lifts than one or two stories.

ESCANABA, a city of Michigan, in Delta co., of which it is the county seat. It is on the Chicago and Northwestern Railroad, and on the northern end of Green Bay, at the mouth of the Escanaba River. It is the center of an important grain and vegetable raising region and is the lumbering center of the county. It is also an important iron shipping point. There is steamship connection with the leading points on the Great Lakes. The city has a high school, public library, bank and daily and weekly newspaper. Pop, 1920, 13,103.

ESCHATOLOGY, the doctrine of the last things; has gone through important changes in Jewish and Christian theology. The roots of the Christian doctrine lie in the Old Testament. At first there is very little that is eschatological; by degrees the idea is developed of the 'day of the Lord,' especially in *Amos* and *Isaiah*. Thus the conceptions of the 'coming of God,' judgment, and future bliss and an eternal kingdom, appear. In the two cent's before Christ this tendency, togethes with the moral difficulty of imagining this life to be the best of all, and the growing Messianic expectation, led to the growth of a large apocryphal and apocalyptic lit. Hence it was into a world already teeming with eschatological ideas that Christianity came. The first generation of Christians lived in the immediate expectation of the coming of their Lord. This hope was disappointed, and Christian ideas of heaven and hell developed gradually.

ESCHEAT, the reversion of an estate to the Crown or lord of the manor, upon the tenant's dying intestate without heirs, or upon forfeiture for treason or felony.

ESCHENBURG, JOHANN JOACHIM (1743-1820), Ger. man of letters; trans. Shakespeare.

ESCHWEGE (51° 11′ N., 10° 3′ E.), town, Hesse-Nassau, Germany. Pop. 12,000.

ESCHWEILER (50° 49′ N., 6° 19′ E.), town, Prussia, Germany. Pop. 24,000.

ESCOBAR Y MENDOZA, ANTONIO (1589-1669), Spanish ecclesiastic; famous preacher and prolific writer.

ESCOIQUIZ, JUAN (1762-1820), Span. politician; entered Church; tutor to Ferdinand VII.; imprisoned for conspiracy, 1807; later in confidence of Ferdinand; exiled, 1915; wrote several works.

ESCORIAL, OR ESCURIAL, palace of kings of Spain, 31 miles from Madrid; it contains a church, convent, and seminary; built, 1563-93; whole range of buildings is square in shape, with church in centre; total area, 396-782 sq. ft.; royal burying-ground; the library, damaged by fire 1671, contains many early MSS.; the church, according to some, is one of finest European buildings of its kind; palace contains many valuable paintings of Velazquez and others.

ESCROW. See DEED.

ESCUINTLA (14° 20′ N., 90° 39′ W.), town, Guatemala, Central America. Pop. *c.* 12,000.

ESCUTCHEON, term used in heraldry for shield displaying armorial bearings.

ESDRAS, THE BOOKS OF. There is considerable confusion as to the nomenclature of the various Ezra books. According to the A.V., the First and Second Books of Esdras appear among the apocryphal books. According to the Septuagint Version, the First Book of Esdras appears as Esdras A, while under the heading Esdras B appear the canonical books of Ezra and Nehemiah. Through the influence of Jerome, this arrangement was not followed in the Vulgate. Here the Book of Ezra is styled Esdras I.; Esdras II. is the Book of Nehemiah, while Esdras I. and II. are re-named Esdras III. and IV. The date of Esdras I. is probably the 2nd century B.C. It is a compilation consisting of: (1) Translation of part of Ezra, (2) part of Nehemiah, (3) part of Chronicles and (4) an original portion giving the discussion of Darius and the three young men. The translation is free and in superior Greek to that of Esdras B in the Septuagint. The Second Book of Esdras, the most pathetic of the Jewish apocalypses, dates from the last years of the 1st century A.D. It contains sixteen chapters of which ch. i., ii., xv., xvi. are later additions, the first two chapters certainly being by a Christian author. The rest of the book tells of seven visions shown to the prophet Ezra, the whole being in the extreme pessimistic tone of the school of Shammai. It is not yet settled in what language Esdras II. was originally written. It now survives only inversions Latin, Syriac, Ethiopic, etc.

ESHER, VISCOUNT, REGINALD BALIOL BRETT (1852), Eng. peer; was M.P. for Penryn and Falmouth 1880-5. Among his publications are *Footprints of Statesmen*, *The Yoke of Empire*, *To-day and To-morrow*, *After the War*, etc.

ESHER, WILLIAM BALIOL BRETT, 1ST VISCOUNT (1817-99), Eng. judge of Common Pleas, 1868; Master of the Robes, 1883; Solicitor-Gen., 1868; cr. Viscount, 1897.

ESK, four rivers, Scotland: (1) North E. (56° 45′ N., 2° 26′ W.), Kincardine, Forfar, flows into N. Sea; length, 30 miles; (2) South E. (56° 47′ N., 3° 3′ W.), Forfar, flows into N. Sea; length, 50 miles; (3) confluence of North E. (45° 53′ N., 3° 5′ W.), and South E. (55° 51′ N., 3° 5′ W.) flows into Firth of Forth; length of each stream is under 20 miles; (4) confluence of Black and White E. (55° 19′ N., 3° 14′ W.), flows into Solway Firth; length, 37 miles.

ESKILSTUNA (59° 21′ N., 16° 28′ E.), town, on Hjelmar R., Sweden; chief seat of iron and steel industries. Pop. 1921, 30,253.

ESKIMOS OR ESQUIMAUX, aboriginal inhabitants of N. America, chiefly found in Greenland and Alaska. Their numbers have been computed at 40,000 ,and the area they inhabit is upwards of 15,000 sq. miles. They are very conservative in habit, and show little desire to adopt civilised manners of life. They are short of stature (average height about 5 ft. 4 in.); have broad, fat faces, black eyes, and coarse black hair. They live by hunting and fishing. For the latter purpose they use the 'kayak,' a light skin canoe, 18 ft. by 2 ft., with an opening in the top, in which the occupant seats himself, wrapped in waterproof skins. In this canoe they capture seals, which they take with the harpoon, to which is attached a line with floats. Hunting is done by means of dogs and sledges. In summer they live in tents near open water. Their winter huts are made of turf and snow, and heated by oil lamps. They usually congregate in settlements of twenty or thirty families. In 1912 the Stefansson Expedition discovered on the Arctic shores of N. America, near Coronation Gulf, some 2000 white Eskimos whose red hair, blue eyes, implements, and other characteristics led to the theory that they are descended from Old Norse vikings who visited N. American from *c.* 1000 onwards.

ESKI-SHEHR (39° 44′ N., 30° 18′ E.), town, Asia Minor. Pop. *c.* 35,000.

ESMARCH, JOHANNES FRIEDRICH AUGUST VON (1823-1908), Ger. army surgeon; prof. of Surgery at Kiel 1857; surgeon-gen. in Franco-Prussian war 1870-71.

ESMERALDAS (1° N., 79° 28′ W.), department, Ecuador, S. America; area, 7439 sq. miles. Pop. *c.* 15,000; capital of dep. is Esmeraldas, at mouth of river E.

ESNA, ESNEH (25° 14′ N., 32° 33′ E.), town, Upper Egypt, on W. bank Nile; barrage. Pop. 20,000.

ESOP. See Æsop.

ESOTERIC, something of a secret or mysterious character; that which is revealed to few; applied to religion, *e.g.* e. Buddhism.

ESPAGNOL SUR MER, LES, naval battle (described in Froissart's Chronicles) fought between Edward III. and Span. fleet of Winchelsea; after hard-fought battle Edward won

ESPALIER, frame of trelliswork upon which fruit trees are trained for better exposure to sun and air; also the trees so trained.

ESPARTERO, BALDOMERO (1792-1879), Span. statesman; of humble birth; enlisted, 1807; fought in America, 1815-23; vigorous defender of Isabella in Civil War of 1832; of strong liberal and democratic sympathies; finally crushed Carlists, 1840; became regent 1841-43; retired from political life, 1856.

ESPARTO, OR SPANISH GRASS (*Stipa tenacissima*), a N. African grass, possessing extremely tough leaves, largely used in paper manufacture.

ESPERANCE (33° 50′ S., 122° E.), seaport and bay, south coast of W. Australia.

ESPERANTO, an international language constructed from elements largely common to Aryan tongues, invented by Dr. L. Zamenhof of Warsaw in 1887. Many periodicals are published in Esperanto, and new books are constantly appearing. Several international congresses have been held.

ESPIONAGE ACT. See ALIEN ENEMY. UNITED STATES HISTORY.

ESPINAL (4° 11′ N., 74° 59′ W.), town. Colombia; tobacco and earthenware. Pop. 10,500.

ESPIRITO SANTO (20° S., 40° 30′ W.), state Brazil, S. America; area, 17,312 sq. miles; surface mountainous in W. and S.; drained by Doce and other rivers; produces coffee, cotton, rice, sugar, tobacco. Pop. 1920, 479,188.

ESQUIMAULT, naval station and naval yard on Vancouver Is., Canada; imperial garrison replaced by Dominion troops, 1906.

ESQUIRE. In Middle Ages an e. was a young man who attended a knight; now the term is legally applicable to any gentleman, *i.e.* according to some, one who bears coat armour, or to gentlemen by position or education; but the exact use of the term is open to question.

ESQUIROL, JEAN ÉTIENNE DOMINIQUE (1772-1840), Fr. physician; succeeded in amending the conditions in lunatic asylums, new asylums being constructed according to his ideas; chief physician at Charenton asylum 1826; author of several medical works.

ESSAD PASHA (*d.* 1920), a Mohammedan chief of Albania, fought for Turks in the Balkan War 1912; occupied Scutari, but eventually handed it over to Montenegrins; when independence of Albania was declared 1913 under Ger. Prince of Wied, first supported prince, but later supplanted him (May, 1914); took refuge for a time on a foreign warship; after outbreak of Great War he led an Albanian force into Durazzo and set up a government in sympathy with the Allies; during winter of 1915-16 he assisted Serbians and Montenegrins in their retreat to Scutari and Durazzo, but was unable to hold up Austrian advance; received the thanks of the Allies for his services; later was in command of a brigade of Albanians on the Salonica front; assassinated in Paris, June 13, 1920.

ESSAY, used as a verb, means to try, or attempt; more generally used as noun to describe a short prose composition, complete in itself. The name and the form was invented by Montaigne (*q.v.*), and his first collection of *Essais* was pub. in 1580. They met with immediate popularity; were trans. into Eng. in 1503 by John Florio and are believed to have influenced Shakespeare. They certainly made a favourable impression on Francis Bacon, whose own first vol. of *Essays* appeared in 1597. The next Eng. essayist of importance, in point of date, is Abraham Cowley 1618-67. The Golden Age of the Eng. e. was the XVIII. cent., when Steele and Addison were contributing to the *Tatler*, *Spectator*, and *Guardian*. Charles Lamb and De Quincey are amongst the greatest of our later essayists. Notable Fr. essayists have been Sainte-Beuave, Théophile Gautier, Jules Lemaître, and Faguet. Emerson's *Essays* occupy a high place in Amer. lit.

ESSEG, ESSEGG OR ESZEK (45° 33′ N., 18° 43′ E.), town, Croatio-Slavonia, Hungary. Pop. 30,000.

ESSEN, town, Rhineland, Germany (51° 28′ N., 7° 1′ E.); centre of Ruhr coalfield; large iron and steel works (including Krupp's); site of Benedictine monastery 1275-1803; interesting minster church. During the Great War it was the chief manufactory of Ger. munitions; now engaged in making agricultural machinery, cash registers, etc.; several times bombed by Allied airmen, notably on Sept. 24, 1916, and July 7, 1917; revolutionary rising took place in the town shortly before the Armistice (Nov. 11, 1918). Essen was occupied by the French in February, 1923, in the couse of their seizure of the Ruhr to extract payment of reparations. See RUHR, REPARATIONS, WAR.

ESSENES, Jewish sect (II. cent. B.C.) who have been the object of much hist. inquiry, because of their possible influence on religious life during Christ's lifetime. They strictly observed the Levitical law; were famed for priestly sanctity; and abstained from worldly affairs.

ESSENTIAL OILS, the oils which possess the odors in a concentrated form of the plants or vegetable substances from which they are obtained. These oils are generally contained in a special gland or cell within the plant. The E. O. are generally insoluble in water, but they dissolve freely in alcohol, ether, or fatty oils. They contain a large proportion of carbon which causes them to ignite easily, but as a rule they leave no permanent grease spot. They possess an aromatic smell, a hot burning taste, and can be distilled unchanged.

ESSENTUKI (44° N., 42° 40′ E.), spa, Terek, Transcaucasia, S. Russia. Pop. *c.* 10,000.

ESSEQUIBO (7° N., 59° W.), district and river, Brit. Guiana, S. America.

ESSEX (51° 44′ N., 0° 30′ E.), county, E. England, having on N. Cambridgeshire and Suffolk, on E. North Sea, on S. Thames, on W. Hertfordshire and Middlesex; area, 1657 sq. miles. Chief rivers, Thames, Stour, Colne, Chelmer, Lea, Crouch, Roding, and Stort. Principal towns are Chelmsford (county town), Colchester, Stratford, Barking, Braintree, and Brentwood; watering-places, Southend-on-Sea, Clacton-on-Sea, and Walton-on-the-Naze; Essex, being near London, is thickly populated. Industries include: Gt. Eastern Railway works, powder and water works, and breweries; important docks at Tilbury and Plaistow; manufactures agricultural implements and silk. Pop. 1920, 1,468,341.

ESSEX, KINGDOM OF, former Anglo Saxon kingdom; included county of Essex and at times the adjoining counties of Hertford and Middlesex; records are chiefly of VII. cent.; conquered by Danes, *cl* 870.

ESSEX, EARLDOM OF, created during XII. cent., and first held by the Mandeville family; subsequently by the Bohuns and Bourchiers, and by Thomas Cromwell. The title passed to the family of Devereaux in 1572, and was held by them for three generations, after which it was conferred upon the family of Capel.—Walter Devereux, 1st earl (1541-76), succ. as Viscount Hereford 1558; cr. Earl of E.1572; earl marshal of Ireland 1576. Robert Devereux, 2nd earl 1566-1601, Eng. statesman; favourite with Queen Elizabeth; lord-deputy of Ireland 1599; disobeyed queen, and was executed. Robert Devereux, 3rd earl 1591-1646, served in attack on Cadiz 1625; lieut-general of army sent against Scot. Covenanters 1639; became commander of Parliamentary army on outbreak of Civil War; twice m., but d. without issue and line became extinct. Arthur Capel 1632-83, Eng. statesman; cr. 1st earl of Capel line 1661; ambassador to Denmark 1669; lord-lieut. of Ireland 1672-77; arrested after Rye House Plot; found dead.

ESSLINGEN (48° 44′ N., 9° 19′ E.), town, Württemberg, Germany. Pop. 30,000.

ESSONNES (48° 35′ N., 2° 26′ E.), town, Seine-et-Oise, France; paper and machinery . Pop. 10,000.

ESTABLISHMENT, CHURCH. Before the conversion of the Rom. Empire as a whole to Christianity the Church was illegal though persecution was intermittent. Afterwards the Church tended to encroach on the State and high claims of temporal power were made by mediaeval churchmen. In England the Church was a unity before the State, and as only one religion existed to which all belonged, the separation of Church and State would have been unthinkable, though great delimitation of their respective spheres continually led to difficulty. In England the Anglican Church stands in a special relation to the State, and its prelates sit in the House of Lords.

ESTAING, CHARLES HECTOR, COMTE D' (1729-1794), French admiral; *b.* Ruvel Auvergne; *d.* Paris. He commanded the French fleet which took an active part against the British in the Revolutionary War. Originally a colonel of infantry in the French army he participated in military operations against the British in the East Indies, where he obtained the command of some vessels in 1759, after the siege of Madras. Thereafter he entered upon a distinguished naval career, becoming a lieutenant-general of the navy, and in 1777 vice-admiral. The fleet he commanded to assist the American colonists against Great Britain in accordance with the treaty between the United States and France was composed of twelve ships of the line and four frigates. He reached Delaware Bay, in July, 1778. captured some prizes off the New Jersey coast, and blockaded the English admiral Howe at Sandy Hook. A storm, which seriously damaged his fleet, prevented his engaging in a battle with Howe's warships. He shifted his operations to the West Indies, where he captured St. Vincent and Grenada. In 1779 he failed to take Savannah from the British in co-operation with American land forces. The next year he returned to France and in 1783 commanded the allied fleets of France and Spain. He was drawn into revolutionary politics, and though favoring governmental reform, he was arrested and executed as a royalist for having testified in Marie Antionette's favor at her trial.

ESTANCIA, S. American cattle-run; equivalent to 'ranch' and Australian 'station.'

ESTATE, landed property; rank or condition; also collective name given to a governing body, as 'The Three E's'—the lords, clergy, and commons. Burke described journalism as 'the fourth e.'

ESTE (45° 13′ N., 11° 39′ E.), town, Venetia, Italy. Pop. 11,000.

ESTE, noble family, originally from N. Italy, which divided into two branches in XI. cent. From one which went to Germany descended the Dukes of Brunswick; subdivided in turn into Brunswick-Lüneburg and Brunswick-Wolfenbüttel. The former became electors and kings of Hanover, and sat on Brit. throne, 1714-1901; they are sometimes called Guelphs. The other branch remained in Italy, and were lords of Ferrara, Modena, and Reggio; famous and cultured princes in Renaissance and Reformation times. Members of this house married into the greatest families, *e.g.* one m. a dau. of Louis XII.; another, Mary, was 2nd wife of James II. of England.

ESTERHAZY OF GALANTHA, aristocratic Magyar house, dating perhaps from XIII. cent., famous since XVI. cent.; Ferencz Zerhazy 1563-94, became lord of Galantha; his *s.* Miklos, or Nicholas, obtained Frakno, a large estate, since held by his descendants. He and his *s.* supported Hapsburg dynasty, latter being cr. prince 1687.

ESTERS, organic compounds whose preparation from acid and alcohol is a reversible reaction, and hence complete conversion never takes place unless some other agent, such as strong sulphuric or hydrochloric acid, is present. Pleasant fruity-smelling liquids used as flavourings.

ESTHER, BOOK OF. E., a Jewess of Susa, becomes wife of King Ahasuerus (Xerxes); aided by her cousin Mordecai, delivers the Jews from a massacre ordered by the king; in celebration of their deliverance the feast of the Purim is founded; the aim of the book is undoubtedly to explain the feast; has a hist. nucleus, but the story has probably been freely treated; its tone is far less religious than Old Testament as a whole; date, IV. or III. cent. B. C.

ESTHONIA OR ESTLAND, independent state, Baltic Provinces (59° 15′ N., 25° 30′ E.); surface flat; chief crops, rye, oats, barley, flax; forests; iron found near Reval; industries include spirits, cotton, machinery. Inhabitants mainly of Finnish race and Protestant. Became Russian 1721 by Treaty of Nystadt; provisional independence recognized by Great Britain, France, and Italy, May 3, 1918. Area about 23,160 sq. m.; pop. 1,750,000. See BALTIC STATES.

ESTIENNE, family of celebrated Fr. painters and scholars. The most noted members were Robert E. 1503-59, and his *s.* Henri E. 1531-98, famed as a Gk. scholar and lexicographer. His best-known works are *Thesaurus linguae Groecoe,* a monumental work, and *Precellence du langage francois.*

ESTON (54° 33′ N., 1° 8′ W.), town, Yorkshire, England. Pop. 12,000.

ESTOPPEL, in law, a bar by which a person is prevented from alleging or denying a previous statement or action.

ESTRADA, LA (42° 40′ N., 8° 30′ W.), town, Pontevedra, N. W, Spain; mineral springs. Pop. 25,000.

ESTREAT, legal term for a duplicate of, or extract from, an original document.

ESTRÉES, GABRIELLE D' (1573-99) Fr. peeress; mistress of Henry IV., over whom she exercised great influence.

ESTREMADURA, EXTREMADURA (39° N., 8° 40′ W.), ancient division of central and W. Portugal and W. Spain; length *c.* 160 miles; capital, Lisbon; Portug.

ESTUARY (Lat. *oestuarium,* from *oestus,* the tide), the name given to an inlet of the sea at the mouth of a river, where the water of the river and the sea meet, and the fresh and salt are mingled. The river seeks an exit in the sea, and the tide flows in towards the river, so that some estuaries are subject to tidal waves of great force.

ESZTERGOM, GRAN (47° 47′ N., 18° 43′ E.), town, Hungary; archiepiscopal see. Pop. 17,000.

ETAH (27° 40′ N., 78° 40′ E.), town and district, United Provinces, India. Pop. 8000. District; area, 1737 sq. miles. Pop. 850,000.

ÉTAMPES, a town in the dept. Seine-et-Oise, France, situated about 35 m. S.S.W. of Paris. It is an interesting place on account of its old churches, the ruins of a castle, and an old town-hall. It has market gardens, and does a considerable trade in cereals. Pop. about 9,000.

ETAWAH (26° 45′ N., 79° 2′ E.), town and district, United Provinces, India; has many fine Hindu temples, finest now used as mosque. Area, 1691 sq. miles. Pop. of town, 43,000; of district, 865,000.

ETCHING, the art of producing pictures by printing from metal plates upon which a drawing has been scratched by a needle. The plate, usually of copper, less frequently of zinc, is uniformly covered with a thin coating of a resinous substance impervious to acid, known as 'e. ground,' and then smoked black. The artist now draws the picture with a sharp etching-needle upon the resinous ground, so that lines of the bare metal appear. The plate is then placed in a bath of dilute nitric acid, which 'bites in' the lines exposed, and does not affect the parts still covered by the 'ground.' If it is desired to have certain lines finer than the others, the fine lines are covered over with Brunswick-black varnish, and the plate again placed in the acid bath, so that the other lines are further bitten in, a process which may be repeated as often as desired. When complete, the plate is removed from the acid, the ground cleaned off with turpentine, and the plate, upon which the design appears scratched upon the metal, is inked, its surface wiped clean so that the ink is left only in the bitten-in lines, and printed. In *dry point e.* the drawing is scratched with the etching-needle directly upon the metal plate, which is then inked and printed. See ENGRAVING.

ETEOCLES (classical myth.), *s.* of Oedipus, king of Thebes; he and his *b.*, Polynices, agreed to reign alternately for a year at a time; differences subsequently arising brought about the Theban War. The bro. kings met in single combat and both were killed.

ETHANE (C_2H_4), hydrocarbon; constituent of coal gas; faintly luminous; an additive compound of ethylene.

ETHELBERT, AETHELBERT (552-616), king of Kent; converted to Christianity by St. Augustine; first to write Saxon laws—*dooms*.

ETHELDREDA, ST., AETHELDREDA (630-79), abbess of Ely; name corrupted into St. Audrey. 'Tawdry' comes from St. Audrey's Fair.

ETHELFRID, or **ETHELFRITH'** King of Northumbria .593-617), the son of Æthelric. He gained a victory over the Britons of the N. at Dawstone in 604, and about 614 over the Welsh at Ccester. In 617, however, he was defeated and slain in battle against Raedwald of East Anglia.

ETHELRED I. *d.* 871, King of the W. Saxons. H ewas the son of Ethelwulf and elder brother of Ælfred. It was in his reign that the Danes first attempted to make settlements in England, their previous incursions being merely for plunder. He conquered them at Reading and Ashdown, and was conquered by them at Merton, where he was wounded fatally.

ETHELRED II. (968-1016) surnamed the Unready' (lacking in 'rede' or counsel). He succeeeded his half-brother, Eadward the Martyr (978.) At first he tried to repulse the Norsemen by bribery, but finally he massacred the Danes (1002) in time of peace in a brutal manner, which led Sveyn to gather a large force to avenge the slaughter, when E. was conquered and obliged to flee to Normandy, his father-in-law being the duke. He was recalled by his former subjects in 1014, which was the year of the death of Sveyn.

ETHELWULF, a ruler of Wessex and Kent (839-858), the son of Egbert. His reign was occupied with constant incursions of the Danes, by whom he was defeated at Charmouth about 842, znd over whom he was successful a few years later at Ockley. On his return from a journey to Rome (856) he found that Wessex was under the rule of his son Ethelbald, and offering no opposition he merely retained the rule of Kent.

ETHER. See AETHER.

ETHER ($C_2H_5O.C_2H_5$) a colorless liquid with characteristic taste and smell, prepared by distilling definite porportions of sulphuric acid and alcohol; B.P. 35°; anaesthetic and solvent for carbon compounds.

ETHEREDGE, SIR GEORGE (1635-91), Eng. dramatist. In his three plays, *Love in a Tub, She Would if She Could,* and *The Man of Mode*, he inaugurated the comedy of intrigue.

ETHERS, organic compounds which contain two hydrocarbon groups united to one oxygen atom—*e.g.*, methyl ether ($CH_3.O.C.H_3$), ethyl ether ($C_2H_5.O.C_2H_5$)

ETHICAL CULTURE SOCIETIES, a movement for the propagation of ethical ideals unhampered by secterian religious dogmas. The original and first ethical culture society was founded in New York City by Dr. Felix Adler, in 1876, then a lecturer at Cornell University. In the speech which gave the impetus to organization Dr. Adler pointed out that much of the energy of religious bodies was given to mutual recrimination and wasted in jealousies and duplication of effort. He proposed that the liberal spirits of all religions and denominations, Christians`together with Jews, should come together on a platform of pure ethics. The society soon established a kindergarten for the children of the working classes, which later developed into a manual training school for boys and girls of the same class, an institution which was the first of its kind in this country. As a result of the agitation carried on by the society came the New York Tenement House Commission in 1884, of which Dr. Adler was a member, bringing about drastic reforms in housing in the slums. Since then the movement has not only spread to other cities of the United States, but to other countries, societies being established in London Vienna, Paris, Geneva and Berlin, the first International Congress of Ethical Culture Societies being held in Zurich, in 1896.

ETHICS, OR MORAL PHILOSOPHY, is often defined as the systematic study, or the science, of conduct or of character. But we can study conduct and character in several ways. We may ask what takes place 'in a man's mind,' as we say, when he acts or wills to act, when he succumbs to or resists temptation, when he forms habits, and so on. We may trace the development of individual conduct from the imitative stage of infancy to the relatively rational life of an adult. To these psychological researches we may add the anthropological, and trace the development of moral conduct and social order in the race from the wild life of savagery to the comparatively reasonable morality of civilized peoples. But these positive studies, though they occupy a great part of treatises on ethics, are really but introductory to the ethical problems proper. When we have ascertained the psychological conditions of conduct and have noted what kinds of conduct have in history been regarded as good and bad, there remain questions such as, How far are actual moral judgments justifiable? What ought we to regard as morally good or bad, right or wrong? What is the moral ideal? What is true welfare? Thus ethics is concerned, not so much with character and conduct directly as with moral judgments upon them, which it seeks to understand and test and clarify.

Upon what do we pronounce moral judgments? Some moralists have maintained that the goodness or badness of conduct depends wholly on the motive which prompts it. Others (*e.g.*, Mill) have argued that the morality of an act depends only on its consequences and not at all on its motive. Both parties to this controversy make an artificial separation of agent from act. An act may be beneficial or injurious, but can have no moral value save as an indication of an agent's intention and character. But, again, the agent's motive should not be judged without any reference to the consequences of his conduct. The true object of moral judgment is either the general character of the agent or his acts as revelations of character, and such acts we judge as wholes, considering both the agent's motive and his actual intention, and also such consequences, as he ought reasonably to have foreseen.

The first movement of reflection upon established maxims of conduct is usually simple revolt. Traditional principles are termed unreasonable, conventional, finally fictitious and false. All men, it is argued, are really selfish, and the high-sounding maxims under which they veil their selfishness represent nothing but the prudence of thieves afraid to attack one another. This doctrine of selfishness (Egoism) is often expressed —*e.g.*,by the Cyrenaics and Epicureans, and in modern times by Hobbes—in the form of Psychological Hedonism, that a man *can* have no other motive than his own pleasure.

The ordinary honest man replies to this selfish doctrine that he knows perfectly well what is right and wrong without any argumentation. This reply formulated as a theory, is known as *Intuitionism.* Thus (1) Shaftesbury and Hutcheson argued against Hobbe that we have in 'moral sense' a faculty which disinterestedly approves or disapproves conduct as right or wrong in itself, just as the aesthetic sense approve beauty and disapproves ugliness. (2 Butler, and more recently Martineau speaks rather of *Conscience*, a principl which in the system of human natur 'plainly bears upon it the marks o authority over all the rest,' so that conscientious, not selfish, conduct is truly following the law of our nature. (3 Earlier writers such as Cudworth and Clarke, also insisted on the immediat and disinterested character of mora intentions, but regarded them as du not to a special moral faculty but to th activity of *Reason*, which apprehend moral truths in the same way as it doe mathematical truths. (4) Kant als relates the moral law to reason—viz., t 'practical reason' or rational will—an argues that since the law must hol alike for all rational beings, our purposes ought to be such that we can wi them, not for ourselves only, but a universal maxims—for all men.

Appealing to the internal law, Intu tionism is an advance upon dogmat reference to external commands o customs. But as a final theory it defective. The verdicts of conscienc though now rapidly and unreflectivel pronounced, usually represent the mor standards of our society, and issue fro past reflection of ourselves or other Moreover, when laws or duties seem t conflict, decision on the right course t pursue is not immediate, but often i volves laborious reflection, Lastly, we can give no account of our mor valuations, we cannot convince one who dissents; all equally conscientious conduct will be equally laudable, however foolish or barbarous it may be.

If we are to show that our duties are constituents of an *intelligible* idea, we must start, as the Greeks started, from a consideration of the question: What is the true welfare of a rational human being? An apparently simple answer to this question is Pleasure. A thoroughgoing egoistic hedonism, such as the Cyrenaic, bids us cull the pleasures of the moment, whencesoever they arise. But, since such extravagant pleasure-seeking defeats its own end, the more practical, though less consistent, hedonism of the Epicureans looks beyond the moment and chooses among pleasures, preferring calm to violent intensity. Social hedonism (or Utilitarianism), on the other hand, whilst agreeing that welfare or happiness consists in pleasures, finds the end of action in the happiness of the greatest number, and not of the agent alone. Bentham, the founder of Utilitarianism, pointed out that fear of the punishment or 'sanctions' imposed by God, nature, public opinion, and law acts as a restraining force upon self-indulgence. But on this showing the most praiseworthy manwould be he who combines successful selfishness with skilful evasion of the penalties. J. S. Mill added to the list of *sanctions* the internal or moral sanction of conscience; but this cannot furnish a bridge from natural selfishness to altruism, because unless we already approved unselfish action, we should not feel remorse for selfishness, nor do we gain the pleasures of a satisfied conscience if our aim is nothing higher than simply to gain them. The fact is that a consistent hedonism must be selfish; Utilitarianisn as an ethical theory is inconsequent though well-meaning. Mill was practically abandoning hedonism when he maintained that pleasures differ qualitatively in value. Herbert Spencer's attempt to re-establish hedonism upon the doctrine of evolution really succeeded, not in its purpose, but in showing that function is more important than feeling.

Whilst consistent hedonism regards all pleasures as good alike, those schools of thought which may be roughly classed together as *ascetic* tend to regard pleasure as not a good at all, or even as positively an evil. Virtue, they say, is the only good, but they represent virtue as consisting essentially in the suppression of desire. They exaggerate the truth that self-restraint is necessary to all good living for men into the doctrine that the excision of passion and desire is the ideal of conduct. But regulation is a very different thing from excision. The reasonable man is not really one who lacks desires, but simply one whose desires are reasonably ordered and directed. The examples of the Cynics and of the early anchorites of Eastern Christianity (on whom see Lecky, *History of European Morals*,)show how intimately the highest exercises of human nature are inbound with its most primitive impulses; for in attempting to cut out desire and passion they had to abandon society and civilization and human love for a life of isolation too often genuinely sordid but not often genuinely humble. The attitude of the Stoics was more dignified, and in its way even heroic; but theirs too is the negative morality of 'natures over-proud,' who regard the ordinary joys and sorrows of our life as at best 'indifferent,' and think that if one likes to do a thing, doing it is very likely wrong, and is certainly morally worthless.

In Kant also is to be found a similar opposition of duty to inclination. In a purely reasonable being, indeed, such as God, reason and will would coincide; we cannot conceive of a moral struggle in God. But we have also a sensuous nature, and like to do much which we ought not to do; therefore the moral law appears to us in the form of an imperative of duty, which claims obedience, not as a means to happiness or anything else, but absolutely or, as Kant says, categorically. But Kant makes this rift in human nature radical; the only moral motive is reverence for the moral law; conduct has moral value only when it springs from sense of duty, none when it springs from inclination; and instead of pointing to a higher stage when desire and duty shall be reconciled, Kant rather aruges that the fiercer the struggle the greater is the merit of right action. So far Kant leaves the moral law empty and formal; nor does he help matters much by the doctrine that we can test the rightness of our proposed conduct by asking whether we could wish every one to act in the same way. This is a useful warning against making exceptions in our own case, but pressed further is hardly true.

In Plato and Aristotle, and again in modern Idealism, is found a broader conception of welfare as the systematic, harmonious, and comprehensive realization of capacity, or, in more simple language, as 'making the most of oneself.' Welfare cannot indeed be described in detail, just because it is an ideal never completely attained, and even to mention its main constituents separately obscures their vital interconnection in actual experience. But it does not, as asceticism holds, exclude pleasures or even sensual pleasures. The sensual man's error lies not in thinking bodily pleasures good, but in neglecting the more specifically human goods such as the acquirement and advancement of knowledge, the appreciation and production of beauty, the reception and reciprocation of friendship and love, the worship of God and enjoyment of divine peace. Moral virtue aims at the attainment of these goods for oneself and others. Not for oneself only, for the good of man as a social being must be a social good. Making the most of oneself does not mean hurting one's neighbour, and it is an error to oppose self and others as if the unselfish really lost through seeking the good of others and the selfish attained real good at the cost of others. Selfishness, even when not sensual, is always narrow, and its last stage, as Plato shows is his sketch of the Tyrant, is desolation.

ETHINE. See ACETYLENE.

ETHIOPIA ('land of the swarthy-faced'), name given by the ancients to an extensive tract of country on both sides of the Upper Nile. It was bounded on the N. by Egypt, on the E. by the Red Sea, and is covered by the modern Nubia and Abyssinia. It was also the Hebrew 'Cush' referred to in the Bible. The capital was Meroë, which became one of the principal trade centres of the ancient world. It was conquered by Cambyses, king of Persia, about 530 B.C.; and again, in later times, by Augustus. In the days of Nero Meroë was in ruins. Traces of its ancient glory, however, are still to be found.

ETHNOLOGY, science treating of relations of races to each other; distinguished from Anthropology, the study of man in relationship to other mammals.

Mankind has been divided by modern ethnologists into these races: (1) *Negro*, or black; (2) *Red Indian*, or brown; (3) *Malayan*, and (4) *Mongolian*, yellow; (5) *Indo-European* or *Caucasian*; and (6) *Semitic*, white. The total population of the world is, according to estimation, 1,646,000,000. of whom 190,000,000 are Negro, 23,000,000 Red Indians, 52,000,000 Malayan, 655,000,000 Mongolian, 645,000,000 Caucasian, 81,000,000 Semitic. The race of many other peoples, especially those of apparently Malayan or Negroid type, has not yet been determined, and the data upon which ethnological judgments should be made is imperfect, but it has been clearly demonstrated that neither evironment nor language is a test of race.

The races of the world may be roughly ethnogeographically divided into (1) the *black* races of the tropics, (2) the *yellow* and *brown* men of Southern and Central Asia and of America, (3) the *white* peoples of temperate climes. The best test, however, is held to be the build of a man, especially with regard to the proportions of his skull.

The chief reasons for believing in a common origin are: (1) physiological similarities and the power of cross-breeding; (2) modern phililogy has resolved the thousand tongues of the world into a few parent speeches, though the search for one original language has been unsuccessful; (3) there are common phenomena of social development, so that every race has its Stone Age, etc. Comparative mythology, law, etc., give the same result as comparative philology.

The earliest relics of man in Europe, found in Somme valley and at Taubach in middle of 19th cent., proved that he existed in the Drift period (*Paloeolithic Age*); later discoveries of Fraas were made at source of Schussen. Mordover, palaeolithic implements are found in France Britain, Russia, the countries of S. Europe, N. Africa, America, S. India. It is an old theory that man spread over the world from Asia; Asiatic fauna are found with remains of palaeolithic man in Drift Beds. Dubois's discovery of *Pithecanthropus erectus* 1891, has led those who accept it to place the cradle of the race in Java, and to trace the first migration therefrom. If so, man must have started on his wanderings when the Eastern Archipelago was part of the Asian mainland when no Indian Ocean separated Asia from Africa, when no Pacific Ocean lay between Asia and America, and Java had land communication with Australia.

Neolithic, who followed Palaeolithic, man, still exists. The Neolithic Age represents the stage in social development through which every race has not yet completely passed. Egypt, Babylonia, and Chaldaea, followed by 'Mycenaeans,' were the first to emerge from Stone Ages into Copper Bronze, and Iron Ages. From the civilized countries of the Mediterranean basin later European civilization has descended. In the earliest writings of Egyptians and Greeks it may be seen that the great human races had already taken their later forms, and men were already speculating on their origin.

The *Negro race* may be subdivided into African negroes, Negritos, Melanesians, perhaps Papuans, Australians and Tasmanians. The relation of these peoples is yet only matter of conjecture. Andaman tribes of Sea of Bengal represent, it is suggested, the primitive negro type. *African negroes*, whose home is S. of the Sudan, have spread all over Africa

Madagascar, and into W. Indies, southern United States, and S. America. They are possibly not an indigenous African population, but conquerors of the Negritos (Span. 'little negroes') or *pygmies*, and made their entry into Africa through Arabia. Pygmies are believed to have occupied the whole equatorial region before the subsidence of the Indo-African continent cut them into two divisions, that of Africa and that of the Malay peninsula.

The *Red Indian race* is confined to America, and is described under INDIANS, AMERICAN.

The *Malayan race* inhabits the Malayan peninsula and 'Malaysia' (the E. Indies). Believed until lately to be Mongolians, they are now considered a separate race of southern conquerors. It is suggested that they belonged to the same race as the Polynesians, from whom they were separated at the subsidence of the Indian continent.

Monogolians probably made their early home on the tableland of Tibet, from which they soon spread over Mongolia, China, and Siberia, and ultimately over Central Asia, parts of Armenia, Caucasia, Irania, Russia, Finland and Lapland, Manchuria, Japan, Siam, Formosa, Korea, parts of Hungary and Balkan peninsula, Madagascar, and the Philippines.

To the *Indo-European* (formerly called *Caucasian*, and lately *Indo-Germanic*) *race* belong most of the peoples of India and Europe. In historical times this race has colonized a large proportion of America and much of Africa and Australia. The Indo-European tongue comprises Sanskrit, Greek, Latin, Romance tongues, Persian, Slavonic, Teutonic, Celtic, etc.

Arabia or N. Africa is assigned as the home of the *Semitic race*; thence it spread over Syria and Palestine. See ANTHROPOLOGY.

ETHYL (CiHi), hypothetical alkyl radicle, base of *Ethyl Series* of organic compounds—*e.g.*, Alcohol, or ethyl hydroxide; ether, or ethyl oxide.

ETHYL CHLORIDE (CiHiCl), a sweet-smelling liquid, volatile and used as an anaesthetic; obtained by passing hydrochloric acid gas into alcohol containing a small quantity of zinc chloride. Heat is applied, and the product is condensed in a receiver surrounded by a freezing mixture. At first used entirely as local anaesthetic, but now produced in very large quantities for the manufacture of drugs and dyes; used extensively as a refrigerant, and also as a solvent.

ETIENNE, EUGÈNE (1844), Fr. statesman; *b.* Algeria; was a republican under the empire, and associated with Gambetta; elected to Chamber of Deputies 1880; was under-secretary for the colonies 1887; under-secretary for the ministry of marine 1889, minister of the interior 1905, and shortly after minister of war. During the Balkan War he became minister of war again, in the Briand cabinet, retaining this post during the administration of M. Barton, which followed.

ETIQUETTE is derived from the Old French *estiquette*, 'a label', another and closer English derivative being 'ticket.' The French word comes finally from the Teutonic *stricken*, 'to post up or affix.' The *estiquette* seems to have been a kind of card of introduction, a meaning which offers some explanation of its later sense. The behavior dictated by good breeding, the formal ceremonies prescribed by authority as appropriate to various social, court, and other official functions, and especially the observance of the rules of precedence, and to the other proprieties of rank and office, are all part of E., which may briefly be described as 'conventional decorum.' The eccentricities of E. are often ridiculed under the burlesque title of Mrs. Grundy.

ETNA (37° 44′ N., 15° E.), volcano, Sicily; height, *c.* 10,760 ft.; summit generally under snow; central districts wooded; soil at base fertile, producing fruits and vegetables; observatory situated about 1000 ft. below summit; last eruption, 1910.

ETNA, a borough of Pennsylvania, in Allegheny co. It is on the Baltimore and Ohio, and the Pennsylvania railroads, and is opposite Pittsburgh. It is an important industrial center and has manufactures of furnaces, pipe works, steel mills, etc. Pop. 1920, 6,341.

ETON (51° 29′ N., 0° 37′ W.), town, Buckinghamshire, on N. bank of Thames opposite Windsor; famous for Coll. founded by Henry VI. 1440 and completed next century; beautiful old buildings including quadrangles and chapel; many additions since; new buildings (opened by Edward VII.) have library and classical museum. Among famous Etonians were: Chatham, Fox, Canning, Gladstone, Shelley, the Walpoles, and Wellington. Pop. 3,100.

ETRURIA (*c.* 43° 14′ N., 11° 25′ E.), a district of ancient Italy, probably including in early times N. Italy, between Alps and Tiber, but later reduced to district bounded by the Arno, Apennines, and the Tiber. Formerly inhabited by Etruscans—a powerful people of whose history little reliable is known, and whose origin is much disputed. Etruscans' own account was that they came from Lybia and formed a mixed race with the *Rasena*, who emigrated from N. Italy; modern critics incline to the view that a Pelasgic race subdued the Umbrians and were conquered by Rhaetian people, called Rasena. Etruria was divided into three great nations occupying Circumpadane Etruria in N.; Etruria Proper in centre; and Campania in S.

Time when Etruscan civilisation began is calculated from objects found in tombs, at about 1000 B.C. Little is known of history, but before VII cent. E. probably held sway over Mantua, Felsina, Melpum, and perhaps Latium and Campania; last three kings of Rome were Etruscans. After expulsion of Tarquins, E. strove in vain to get foothold in Rome under Lars Porsena of Clusium; was subjected to Rome in 283, and ultimately defeated by Q. Fabius Maximus at battle of Vademonian Lake (*c.* 310); after this E. gradually lost independence and was absorbed in the Roman State. A former treaty with Carthage, by which E.—who held power over shipping in Tyrrhenian Sea—got Corsica and Carthage Sardinia, proves their one-time proud position.

E. was once thickly populated with well-distributed towns, of which the chief were: Veii, Tarquinii, Falerii, Caere, Volci, Clusium, Cortona, Perusia, Volsinii, Arretium, Faesulae, and Populonium. The people were great warriors, and the country drew much wealth from its agriculture and forestry, for which the land was exceedingly well adapted, with rich soil for crops and cattle; fine tracts of forests; and the three rivers, Arnus, Umbro, and Tiber. E. also amassed great wealth by her commerce, and became an important centre for foreign traders.

Etruscans were not brilliant in art, but pictures and statuary are of good standard; best paintings and fine gold and silver ornaments found at Tarquinii, Chiusi, Volci, Caere, and Veii. The Etruscan language disappeared after the III. cent. B.C.

ETRUSCAN ARCHITECTURE, the style of architecture which was developed among the Etruscans or Tyrrhenians, a people whose civilisation may be dated from 1000 B.C. Archaeological evidence, derived chiefly from burial urns and tombs, goes to prove that the Etruscans were quite devoid of any artistic sense. To judge from the so-called hut-urns, their most primitive dwellings were one-roomed, rectangular structures with thatched roofs and wattled walls. These were replaced by wooden cottages with sloping roofs of planks running longitudinally and also transversely. Their temples were usually square, with the 'cella' divided into three compartments, the decorations, like acroteria and friezes, being of terra-cotta nailed to wooden walls. Underground sepulchral monuments, like 'la Cucumella' in Volsci, were clearly imitations of similar 'tumuli' in Lydia, whilst most Etruscan ornament, such as capitals, mouldings, and metopes, was but a crude and almost barbaric transcription of Greek originals. The Romans would speak of colonnades with the pillars far apart as in the 'Etruscan style,' which shows that the Tuscan architects had reproduced their borrowed models not in stone but wood, which permits of a greater span for the architrave. There are still ample remains of the massive cyclopean walls which surrounded the chief towns, sometimes for 6 or 7 m.

ETTRICK (55° 29′ N., 3° 3′ W.), river, Selkirkshire, Scotland; joins Tweed; near source is village and parish of E. (55° 26′ N., 3° 12′ W.),

ETTY, WILLIAM, R. A. (1787-1849), Eng. artist; painter of hist. subjects; great colourist; untiring student of anatomy. His landscapes and drapery always harmonise admirably with his figures.

ETYMOLOGY (Gk. *ervuov* and *yoyos*) an investigation into the origin and original significance of words. It forms a subsidiary part of the science of comparative philology, but has only been scientifically studied within the 19th century. False Es. have been often suggested through ignorance and half-knowledge. Folk-E. has played an important part in the development of languages. Words that people have known from their childhood are for them as things, but it is quite different with the new terms they meet. They arrest their interest and believing that every word has its signification they seek for this, guided by resemblances of sounds with words already known, thus reaching false conclusions by using false analogies. Various examples of the same illogical process are found in the O. T., in the Homeric tales, in quaint Es. of mediaeval writers, and even in some of the present-day dictionaries. Scientific E. was made possible by the birth of philology and study of the languages of the East. It no longer sought the relation between the words of a single language, exclusively within itself, but extended its view to a whole group of cognate tongues, or, wider still, to a whole family. Thus a new cience arose under the title of Com- arative Grammar. Thus the evidence hat the group of language known as he Aryan languages form a family, *i.e.* re all sister-dialects of one common ongue, consists in their grammatical orms being the same, and in their having a great many words in common. n judging whether an individual word n one of these tongues is really the same s a word in another of these tongues, ne is no longer guided by similarity of ound. Words are cosntantly under- oing changes, and each language fol- ows its own fashion in making these hanges. Corresponding words, there- ore, in the several languages, must have, n the long course of ages, come to differ reatly: and these differences follow ertain laws which it it possible to scertain. Of the laws of interchange f sound, Grimm's Law, named after he great German philologist, is the most nportant. It exhibits the relations ound to exist between the consonant ounds in the three groups of the Aryan nguages. Followers of this theory were urtius and Fick. The Teutonic revival n the 19th century in England, com- nenced a history of English upon an istorical method from which has grown really scientific English E., as seen in ne dictionaries of Professor Skeat and r. Murray.

EU (50° 2′ N., 1° 25′ E.), town eine-Inferieure, France; has XVI.- nt. castle, damaged by fire, 1902; fine othic church; Jesuit chapel; manu- ctures flour. Pop. 5,400.

EUBOEA (38° N., 24° E.), largest land Grecian Archipelago; separated om mainland on S. W. by channel, .W. part of which was anciently cal- d Euboean Sea and narrowest part uripidus (*c.* 120 ft.), and spanned by dge; area, 1505 sq. miles. Chief town, arystos. Pop. 128,000.

EUBULUS (fl. *c.* 350 B.C.), Athenian atesman; famed for his financial abili- es and love of peace, in which latter olicy he had a strong opponent in emosthenes.

EUBULUS (fl. 370 B.C.), Gk. comic amatist.

EUCALYPTUS, genus of trees of atural order *Myrtaceoe*, including about 0 species, growing chiefly in Australia nd Tasmania, often to the height 150-200 ft., and sometimes to 450-500 . Many species are called gum-trees, om their resinous exudations, and their aves are leathery, containing numerous -glands. They are believed to assist the prevention of malaria in marshy stricts, probably rather by the drainage of the large roots than from the antiseptic action of the smell. From the *E. rostrata* a red gum is obtained, used medicinally as a powerful astringent, while the oil distilled from the *E. globulus* is used as an antiseptic for wounds, etc.

EUCHARIST.—The beginning of the E. is to be fouhd in the Last Supper instituted by Christ. According to the Synoptic Gospels it was a Paschal meal, according to St. John it was not. Probably the latter is right. The ideas underlying it of sacrifice and communion are to be found among the Jews and other ancient peoples (see ROBERTSON SMITH, *Religion of the Semites*). The earliest New Testament account is in *1 Corinthians* 11, where the words, 'I have received of the Lord,' refer to a special divine revelation to Paul. The account in *St. Mark* comes next, where the words, 'I will not henceforth drink of the fruit of the vine,' have, it has been said, an antique ring about them. The Lucan and Matthean narratives add the words, 'This is my blood, etc.,' but are probably due to the influence of the Pauline passage. St. Luke puts the delivery of the cup before the bread. St. John is very different, with no commemorative rite. In the *Acts* we read that the Christian Church was continual in the 'breaking of bread and in prayers.' Catholic theologians have believed this justifies communion 'in one kind.' Of extra canonical accounts of Eucharistic observance one of the most important is that in the *Didache*, in which occur the words, 'As this broken bread was scattered upon the mountains and being gathered together became one, so may Thy Church be gathered together from the ends of the earth into Thy kingdom.'

In the Anglican Church various views are prevalent, the Anglo-Catholic party asserting belief in a *real* though not a corporeal presence. In most Non-conformist churches the E. is observed, though in some it is dropped. Quakers have never observed it. It has not generally the importance in religious life among Protestants which it has with Catholics. The forms of celebration differ widely, the Anglican is like the primitive, the Rom. very ancient in parts, the Gk. considerably different.

EUCHRE, card game. It is played by two or more persons with thirty-two cards, all cards below seven being withdrawn from the pack.

EUCKEN, RUDOLPH CHRISTOPH (1846), Ger. philospher; prof. of philosophy, univ. of Jena, since 1874; earlier writings historical, later constructive; philosophy not merely intellectualistic.

but religious inspiration applied to practical problems; awarded Nobel prize for literature 1908.

EUCLID, Gr. mathematician of 3rd cent. B. C.; nothing known of life, except that he taught maths. at Alexandria; immortalized by work *Elements of Geometry* (13 books), which was till recently always used as an introduction to study of geometry. With the development of arithmetic and algebra, and the demands for modern method, the *Elements* has gradually ceased to be recognized as the standard authority. It is not possible to say how far Euclid's works were original, but some of his propositions were certainly discovered by his Gr. predecessors. Also the author of *Data, Divisions of Superficies, Porisms*, etc.

EUGENE, a city of Oregon, in Lane co., of which it is the capital. It is on the Southern Pacific, the Oregon Electric, and the Portland, Eugene and Eastern railroads. It is the center of a large and important agricultural region and is also a chief point for the lumber industry. Its industries include canneries, flour mills, woolen mills, machine shops, etc. Eugene is the seat of the University of Oregon and the Eugene Bible Institute. It has a public library and other public buildings. Pop. 1920, 10,593.

EUGÈNE, FRANÇOIS, PRINCE DE SAVOIE (1662-1736), a renowned French general, was *b.* at Paris. He was the youngest *s.* of the Count of Soissons, *gs.* of Duke of Savoy. Originally intended for the church, but his tastes were more for military renown. After his father's death, and on the refusal of Louis XIV. to give him a commission, he left France and served under Emperor Leopold as a volunteer against the Turks. He displayed great courage and tactical talent, and rapidly rose. In the Coalition War in Italy against France, he covered himself with glory, became a field-marshal in 1693, and put an end to Turkish power in Hungary by winning the famous battle of Zenta in 1697. He commanded the Italian army in the War of Succession in 1701, but effected little of importance, owing to the smallness of his forces. In 1703 he became president of the council of war, took over command of the German army, and assisted Marlborough to win the battle of Blenheim, 1704. After being checked by the French general, Vendome, and twice wounded, he defeated the French and drove them out of Italy. He shared with Marlborough the victories of Oudenarde and Malplaquet. After the retirement of England and Holland from
the struggle, Prince E. was unable t
withstand the enemy on the Rhin
and was defeated by Villars in 171
In 1716 war with the Turks recom
menced, and the prince was everywher
successful. He defeated an army twic
the size of his own at Peterwerdein, too
Temesvar, and after a desperate batt
took Belgrade by assault. After th
Peace of Passarowitz he labored wit
unwearied energy in the cabinet. He
at Vienna.

EUGENICS (Gr. *eu*, 'well', and *geno*
'race'), the science which treats of th
physical well-being of a race and of th
influences which tend towards improv
ment or degeneration. From ear
times efforts have been made by vario
nations to produce a physically sou
race. It was left, however, to S
Francis Galton to crystallize the id
into a science. Besides writing a
research, Galton founded a chair
eugenics in the univ. of London, no
held by Karl Pearson, who has direct
much valuable statistical research, whi
has not been impugned. Eugenis
hold that nature is much more importa
than nurture (their relations bei
expressed by 6 to 1). Goring confirm
the earlier work of Heron, proving fr
statistics taken from criminals (assum
to represent for this purpose a chan
selection of the general populatio
that consumption is almost if not who
due to heredity. Drunkenness is a
stated to be much less due to surrou
ings than to inherited tendenci
Other work of the eugenists claims
prove that the professional classes
much less fertile in production than
wastrels of the community. T
theories of eugenics are based upon
study of heredity. It seeks to apply
knowledge thus obtained to the impro
ment of the human stock by selecti
in mating. It has been proved that
qualities which influence heredity
contained in the chromatin of the nucl
of the male and female germ cell. T
substances contained in chromatic
which influence development are cal
determinants, and in certain directi
their influence may be predicted.
periments upon flowers and guinea
has proved that characteristics may
transmitted. Similarly it is belie
that in man these qualities may
transmitted with equal certainty.
the breeding of domestic animals imp
tant results have been obtained
strains have been developed marked
certain qualities which are desira
such as milk production, fat formati
wool production, etc. All these anim
however, were bred under strictly ar
cial conditions. It has also been fo

that only the qualities resident in the germ affect heredity and that qualities which are acquired and are due to environment are not inherited. While this is true, conditions of environment are equally important for the improvement of the race, for a good environment may make possible the development of qualities which otherwise night be suppressed. The most important qualities which affect man in his social relations are the mental, such as general mental ability, temperament, etc. These are undoubtedly due to inheritance but to what extent is unknown. The application of eugenics is still in its infancy and there is need of more extended and exact knowledge of heredity in man before any general measures looking toward the improvement of the race can be undertaken with expectation of success.

EUGÉNIE, MARIE EUGÉNIE IGNACE AUGUSTINE DE MONTIJO (1826-1920), ex-empress of the French. *b.* Granada; of Span., Ital., and Scot. descent; married Napoleon III. 1853; retired to Chislehurst, Kent, with deposed emperor and son 1871; afterwards lived at Farnborough and Cap Martin; her son the Prince Imperial was killed while serving as a volunteer in the Brit. force in Zuzuland 1879.

EUGENIUS, name of four popes, of whom the most important were: E. III. 1145-53, pupil of St. Bernard. During his reign Arnold of Brescia was for a time supreme in Rome, and Second Crusade took place. E. IV. 1431-47 engaged in strife with the Colonna family; deposed by the Council of Basel, but restored 1443.

EULENSPIEGEL, TILL, hero of a XVI.-cent. Ger. chap-book, full of coarse rustic jests and broad satire.

EULER, LEONHARD (1707-83), eminent Swiss mathematician; *b.* Basel; Bernouilli's pupil; prof. at St. Petersburg 1730; at Berlin at invitation of Frederick the Great 1741-66; returned to St. Petersburg, where he died. E. chiefly worked at problems left by Newton. Wrote *Theorie de la Construction et de la Manoeuvre des Vaisseaux*; *Institutions of the Differential and Integral Calculus*; *Theory of Planetary Motion.*

EUMENES (*d. c.* 316 B.C.), famous Macedonian gen. who, after serving under Philip II. and Alexander, became ruler over Cappadocia.

EUMENES I., king of Pergamum (263-241 B.C.), Eumenes II., king, 97-159 B.C.; formed alliance with Rome; Pergamum flourished in his reign.

EUMENIUS (*c.* 260-311 A.D.) Rom. panegyrist.

EUMOLPUS (classical myth.), reputed founder of the Eleusinian mysteries.

EUNOMIUS (*d. c.* 394), bp. of Cyzicus; was leader of extreme Arian party; his heresy condemned by Council of Constantinople.

EUNUCHS, emasculated male persons; commonly employed as servants in Oriental harems.

EUPALINUS, Gk. architect who constructed an aqueduct for Polycrates of Samos *d.* 522 B.C., which still exists.

EUPATORIA (45° 11′ N., 33° 22′ E.), port, Russia, on W. coast of Crimea. Pop. 17,000.

EUPATORIUM, family of composite plants common in America, and found in parts of Europe; various species used medicinally, and others in dyeing and tanning.

EUPATRIDAE, nobility of Attica; probably they alone possessed political power, and not the *Geomori* (country folk) or *Demiurgi* (artisans); only a Eupatrid could be *polemarch* or *archon.*

EUPEN (50° 37′ N., 6° 3′ E.), town, Rhine province Prussia. Pop. 13,000.

EUPHEMISM, soft or pleasant turn given to the expression of a rude or unpleasant fact.

EUPHONIUM, brass wind instrument of saxhorn family, with four and sometimes five valves; usual pitch, C or B flat.

EUPHORBIA, oil obtained from seeds of *E. lathyris*; similar to croton oil; Euphorbium is resin obtained from varous African species of e.; used in liniments, etc.; both preparations are strong and pungent.

EUPHORION (fl. 220 B.C.), Gk. poet and grammarian; valued elegies.

EUPHRANOR (IV. cent. B.C.), Gk. artist and sculptor.

EUPHRATES, largest riv. in W. Asia, called in the O.T. 'the river' (Exod. 23: 31) and 'the great river' (Deut. 1:7). Total length, *c.* 1,800 m.; breadth varies greatly, above estuary half a mile. Source, in Armenia, consists of two arms, Kara Su (rising N.E. of Erzerum) and Murad Su (rising near Lake Van, and joining near Keban Maadin); flows through mountainous region of Taurus; lower down separates Mesopotamia from Syria and Syrian Arabia; joined by Tigris at Kurna; united river called

Shatt-el-Arab, and flows into Persian Gulf by many branches. Upper course is wild and mountainous; country level near Hit, and river in middle and lower courses flows through plains, deserts, and swamps, sparsely cultivated, and inhabited by lawless Bedouin Arabs, Between Ana and Hit, river is studded with islands. In anc. times rich cultivated plain well watered by canals; several mouths of smaller canals still kept open. Near Basra quantities of dates and rice are grown. Banks of river teem with anc. remains representing all periods; site of Babylon. Principal tributaries: Sajur, Balik-Su, Khabúr, and Kharúm. Present chief towns: Samsat, Bir, Ana, Hit, Hilla, and Basra. Formerly used as means of transportation, even of armies; now owing to rapids, currents, falls, rocks, and ruins of dams, river is rendered unnavigable in middle and upper courses. Chseney's expeditions *c.* 1830-5, discovered navigation impossible above Bir, except for native rafts. Great floods take place, due to melting snows on mountains of upper course. During the World War, in the course of the Mesopotamian operations, Brit. troops occupied Basra and Nasrie (where the anc. Tigris joined the Euphrates) and penetrated as far as Ramadie. A railway, with branches to Bagdad, follows the river between Ramadie and Hilleh, and between Nasrie and Basra, and others are under construction.

EUPHUISM, name for a stilted style of writing invented by John Lyly in fantastic romance *Euphues* 1579-80. It was intended for the reading of the upper classes; naturalness was carefully avoided, the style being distinguished by far-fetched metaphors, similes, and alliteration. Queen Elizabeth succumbed to it; Shakespeare mocked at it in *Love's Labour's Lost.* Greene and others imitated it; but its vogue was exhausted early in James I.'s reign.

EUPOLIS (fl. 446-411 B.C.), Gk. comic poet; rival of Cratinus and Aristophanes.

EURASIAN, term used to designate half-castes sprung from Europeans and Asiatics; principally in India. *Eurasia* in geography is Europe and Asia taken together.

EURE (49° 5′ N., 1° E.), department, N.W. France; area, 2330 sq. miles; drained by Eure and Seine; produces cereals, timber, flax, fruit. Pop. 1921, 303,159.

EURE-ET-LOIR (48° 25′ N., 1° 30′ E.), department, N. W. France; area, *c.* 2291 sq. miles; drained by Eure, Loir, and Seine; produces wheat, silk, cider; woollens. Pop. 1921, 251,255.

EUREKA COLLEGE, a coeducational institution situated in Eureka, Illinois. It was founded by the Christian Church in 1855. In 1922 it had a student roll of 208 and 22 teachers under the presidency of L. O. Lehman.

EUREKA, a city of California in Humboldt co., of which it is the county seat. It is on the Northwestern and Pacific railroads, and on Humboldt Bay, 225 miles N.W. of San Francisco. The city has an excellent harbor which has been improved by the United States Government. It is in the famous redwood region and has large lumbering interests. Sequoia Park, a national park, including 20 acres of virgin redwood forest, is near the city. Pop. 1920, 12,923.

EURIPIDES (480-406 B.C.), Gk. tragic dramatist; *b.* Salamis; *s.* of Mnesarchus, a wealthy trader; was intended for an athlete, but adopted painting, subsequently turned to dramatic work and brought out his first play, the *Peliades*, at the age of twenty-five. E. is said to have written about ninety plays; gained the first prize at the age of thirty-five, and four times subsequently, Unlike his great contemporaries, Æschylus and Sophocles, he appears to have taken no part in public affairs. On the contrary, he is known to have been a student and recluse; his domestic life is said to have been unhappy, and he doubtless suffered from the attacks of his great contemporary, Aristophanes. In later life he forsook Athens and made his home at the court of Archelaus king of Macedon, and tradition attributes his death to violence at the instance of jealous enemies. His extant works include: *Alecstis, Medea, Hippolytus Hecuba, Andromache, Suppliants, Ion, Heraclidoe, Troades, Helena Phoenissoe, Orestes, Bacchoe Iphigenia in Aulis, Hercules Furens, Iphigenia in Tauris, Electra,* and *The Cyclops.* E.ranks below *A*eschylus and Sophocles, but his plays served as the model for later writers.

EUROPA (classical myth.), *d.* of Agenor, king of Phoenicia; carried away to Crete by Zeus, under form of white bull, and became *m.* of Minos, Sarpedon, and Rhadamanthus.

EUROPE, the most westerly and the smallest continent of the Old World, has an area of 3,750,000 sq. m.; its mainland lies between 36° and 71° 6′ N., and between 66° 20′ E. and 9° 30′ W. The extreme length (from Nordlyn on the N. to the S. of Greece) is about 2,400 m., the extreme width from E. to W. about 3,000 m. Europe is bounded N. by the Arctic Ocean, on the E. by the

Ural Mts., Ural R., and the Caspian Sea, S. and S.E. by the Caucasus, Black Sea, Bosporus, Sea of Marmora, Dardanelles, and Aegean Sea, S. by the Mediterranean as far as the Strait of Gibraltar, where Europe is 8 *H* m. distant from N.W. Africa, W. by the Atlantic Ocean.

Physical Features.—The Brit. Isles are separated from the mainland by the Eng. Channel and North Sea, Iceland by the North Sea, Novaya Zemlya, Spitzbergen, etc., by the Arctic Ocean. The coast-line, about 48,000 m. in extent, is very much broken. It throws out the great south-pointing peninsulas of Norway and Sweden (Scandinavia) on the north, Spain and Portugal (Iberian Peninsula), Italy, and that of Balkania and the Crimea on the S. and the north-pointing peninsula of Denmark. All along it are islands, sheltered roadsteads, and situations for harbours. The many land-locked seas and considerable inlets and the navigable rivers bring a large area within convenient reach of the sea. Except in Russia, no place is more than 300 m. from the sea, and the great plain of Hungary is the only large region from which access to the sea is difficult. In the N.E. traffic is interrupted in winter by the freezing of seas and waterways.

The principal system of mountains in Europe consists of a series of folds radiating from the Alps. A great W. loop passes through the Apennines of Italy, Atlas of N. Africa, into Spain as the Sierra Nevada, and with the Pyrenees, a short branch, probably rejoins the Alps. To the E. the great Carpathian fold encircles the Hungarian plain before passing into the Balkan peninsula as the Balkan Mts., and by the Crimea into the Caucasus. Another fold, the Dinaric Alps, forms the E. boundary of the Adriatic Sea, becomes the Pindus range in Greece, and passes into Asia Minor. To the N. of this great system are the dissected plateaus of Spain, France, Bohemia, Scandinavia, and N. Scotland.

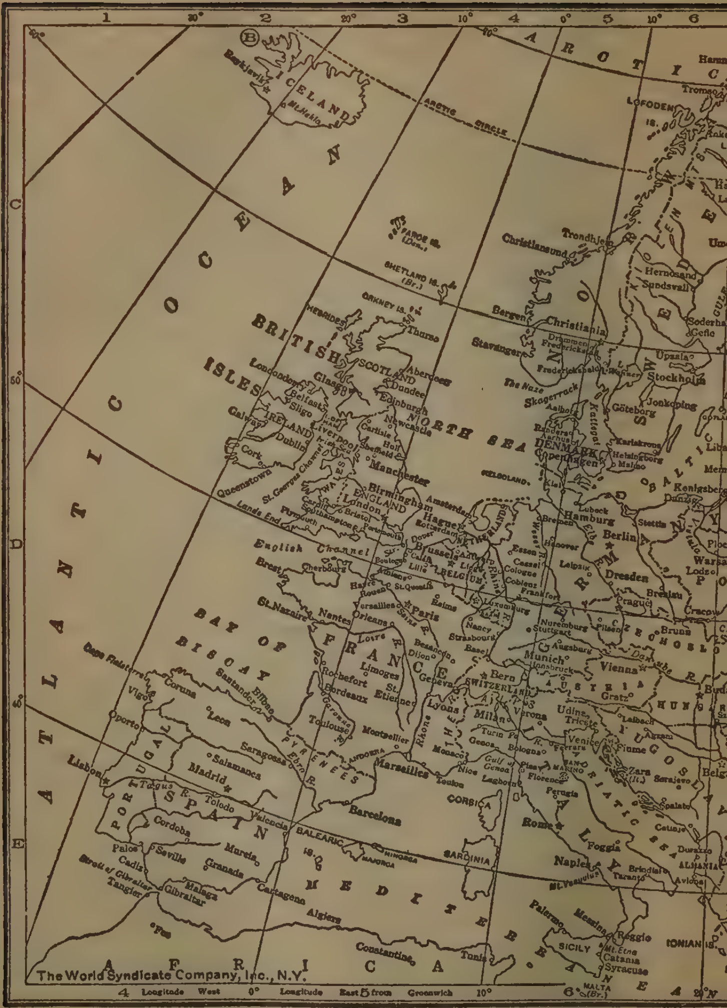
About two-thirds of the surface is a great plain, of which the greater part is under 600 ft. above sea-level. It begins in S. of England and Bay of Biscay and extends through N. and E. of France (which was united to England in a recent geological period), N.E. to the tundras along the Arctic Ocean, E. and S.E. to the Caspian and Black Seas; low lands extend along the coast and lower courses of rivers of Portugal, Spain, S. France, Italy, Turkey ,and Greece; and along the Danube, encircled by the Alps, Carpathians, and Balkans are the plains of Hungary and Wallachia. A considerable area around the N. end of the Caspian Sea is below sea-level. There are two great lake areas, one in the low-lying dist. round the Baltic, the other in the mountainous region of the Alps —both districts which have been subjected to intense ice action.

The Alps and the Valdai Hills are the principal watersheds; from the former flow the Rhine (to the North Sea), Rhone, Po, and Adige (to the Mediterranean), and the Danube tribs. (to the Black Sea); from the latter descend the N.Dvina (to the White Sea), the Volga (to the Caspian), the Don and Dnieper (to the Black Sea), the W. Dvina and Nieman (to the Baltic). The countries of Europe are Portugal, Spain, Andorra, France, Britain, Netherlands, Belgium, Luxembourg, Germany, Switzerland, Monaco, San Marino, Italy, Austria, Liechtenstein, Czecho-Slovakia, Hungary, Poland, Jugo-Slavia, Denmark, Norway Sweden, Finland, Rumania, Bulgaria, Albania, Greece, Turkey and the various republics of post-war Russia.

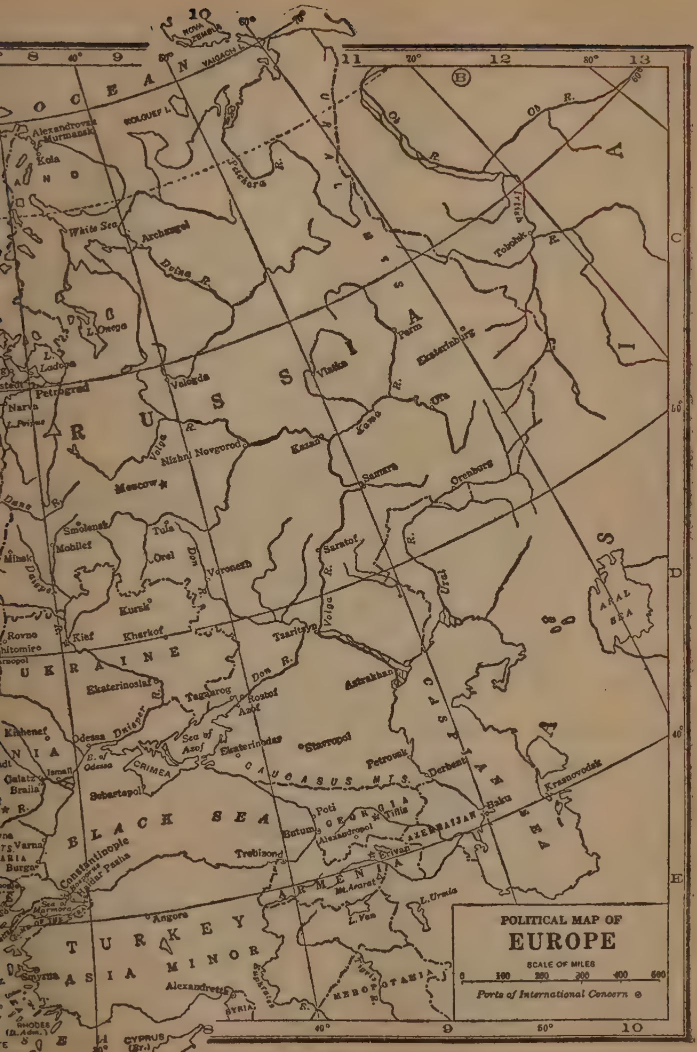
Geology.—Archaean and Palaeozoic rocks appear in the N. (the Outer Hebrides, Norway, N. Russia, etc.), and in the great highland areas above mentioned. S. of the northern band Cambrian, Silurian, Devonian, and Carboniferous strata were deposited, stretching from Cumberland and Wales eastward. Then followed the Permian, Palaeozoic, and Mesozoic periods, during which the sea covered much of S. and Central Europe, the Cretaceous period in which there was a great upheaval, continued in the Eocene, Miocene, and Pliocene periods, the last-named being the age of volcanoes. The Glacial period practically completed the conformation of the continent. The precious metals are not found in abundance, but there are rich veins of coal (chiefly in Britain, Belgium, France, Germany), iron (the same, with Sweden and Spain), copper (Sweden and Spain), lead (Spain), zinc (Germany), mercury (Spain and Austria), sulphur (Sicily), and salt (Austria).

Owing to the position of the continent in the N. temperate zone, the influence of the Gulf Stream along the N.W., the large amount of inland water, and the slope and exposure of the great plain, Europe has a more temperate yet more varied climate than any other continent. The extreme N. is arctic, the sheltered Mediterranean district sub-tropical. The S.W. winds, blowing over the warm Gulf Stream, bring abundant moisture and heat; nowhere is agriculture impossible owing to drought except in S.E. and in interior of Spain. As a rule, rainfall decreases and range of temperature increases from W. to E.

Flora and fauna vary in accordance with climate—*i.e.* from sub-arctic to



The World Syndicate Company, Inc., N.Y.


POLITICAL MAP OF
EUROPE
SCALE OF MILES
0 100 200 300 400 500
Ports of International Concern ⊕
OCEAN
NOVA ZEMBLA
VAIGACH I.
KOLGUEF I.
Alexandrovsk
Murmansk
Kola
White Sea
Archangel
Dvina R.
Petchora R.
L. Onega
L. Ladoga
Petrograd
Narva
L. Peipus
Vologda
RUSSIA
Vologda
Viatka
Perm
Ekaterinburg
Tobolsk
Irtish
Ob R.
Ufa
Kama
Kazan
Nizhni Novgorod
Volga R.
Moscow
Smolensk
Mohilef
Minsk
Dniepr
Tula
Orel
Don R.
Voronezh
Kursk
Kharkof
Kief
Rovno
Zhitomir
Samara
Orenburg
Saratof
Ural R.
Tsaritsyn
Astrakhan
UKRAINE
Ekaterinoslaf
Taganrog
Rostof
Azof
Don R.
Odessa
B. of Odessa
Kishenef
Ismail
Galatz
Braila
CRIMEA
Sea of Azof
Sebastopol
Ekaterinodar
Stavropol
CAUCASUS MTS.
Petrovsk
Derbent
Baku
CASPIAN SEA
Krasnovodsk
ARAL SEA
ASIA
BLACK SEA
Poti
Batum
GEORGIA
Tiflis
Alexandropol
AZERBAIJAN
Erivan
ARMENIA
Mt. Ararat
L. Van
L. Urmia
Trebizond
Varna
Burgas
Constantinople
Bosporus
Haidar Pasha
Sea of Marmora
Angora
TURKEY
ASIA MINOR
Smyrna
Alexandretta
SYRIA
Euphrates
Tigris R.
MESOPOTAMIA
RHODES (It. Adm.)
CYPRUS (Br.)
8 9 10 11 12 13
B C D E
40° 50° 60° 70° 80°
9 10

sub-tropical. Indigenous animals include bear, wolf, elk, chamois, many species of deer, foxes, hares, and rabbits. A few bison are left in Central Europe. The North Sea provides a valuable fishing-ground for herring, cod, mackerel, etc., while tunny fishing is an important Mediterranean industry. Of native trees, fir, oak, apple, pear, and cherry are the most common, while many varieties—*e.g.*, myrtle and fig—imported centuries ago from Asia, are found to thrive excellently.

Every cultivated product can be grown farther N. than in other continents. The central regions produce timber, fibres, cereals, and hardier fruits, the S. sub-tropical fruits, the N. the hardier cereals; abundance of pasture and excellent fisheries.

Races.—The langauges spoken may be classified as Indo-European, Semitic, and Slav, the races roughly described as Caucasian. The question of races is by no means settled, but ethnologists, now entirely disregarding the test of language, tend to divide European races into the three chief classes of 'Teutonic' (tall, dolichocephalic, with blue eyes and fair hair), 'Mediterranean' (of middle height, dolichocephalic, with dark hair and eyes), and 'Alpine' (stocky and brachiocephalic, with medium colouring)—possibly all modifications of one original European race. The identity of the Iberians, who preceded the Celts in Britain and are to be traced in Spain and elsewhere, is still disputed; while the Celts, it is thought, were midway between the Teutonic and Mediterranean types. The ethnological problems of the Gr. and Ital. peninsulas are still unsolved.

The total population is estimated at 450,000,000.

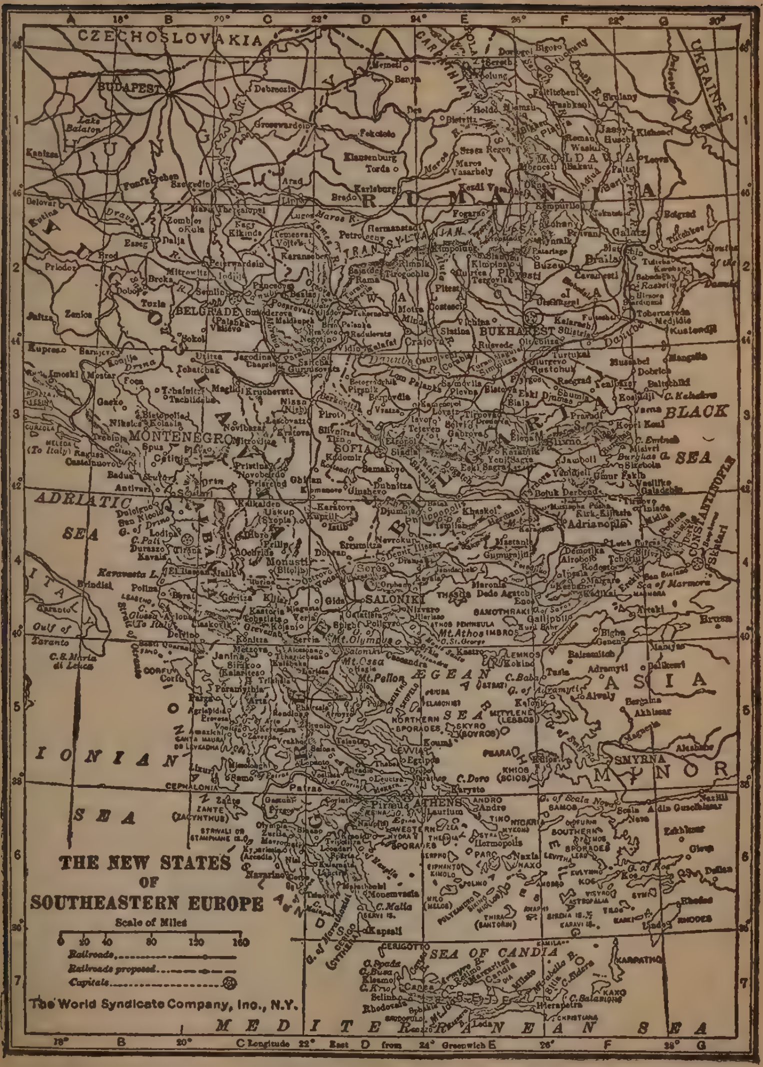
History.—The earliest civilization of Europe was in the Troad, the E. coast of Greece, and the islands of the Ægean Sea. This Pelasgian, Mycenaean, or Minoan period lasted from *c.* 2000-1000 B.C.; the Minoan towns are supposed to have acquired their arts from Egypt through Phoenician traders. The Hellenic period followed, and by the 7th cent. B.C. the highly organized and cultivated city-states of Greece were flourishing, while the rest of Europe was occupied largely by Celtic and Teutonic races, who for many centuries preserved their tribal organization. One aspect of the history of Europe is the fall of the city-state and the tribe before the empire, and the subsequent overthrow of the empire by the modern nation. There were signs of unity in Greece in the alternate Athenian and Spartan supremacy, but never any true pan-Hellenic feeling; it was no great disgrace to Medize, and the alliance against Philip of Macedon was too late to save Greece from the decisive defeat at Chaeronea 338 B.C.

The vast empire of Alexander the Great, the next salient feature of history, broke up after his death in 323 B.C., and was succeeded by the world-power of the Romans. The Roman Empire existed in some form until 1806. Rome ceased to be its centre in A.D. 330, when Constantine the Great established his capital at Byzantium, henceforth Constantinople; it was divided into East (Byzantine) and West in 395, with Rome as cap. of the Western division; it was restored to nominal unity by the deposition of Augustulus, last Roman emperor of the West, by the Goths in 476, but this event really meant the final division of East and West. The disputes about images in the churches caused the pope and Romans to repudiate the rule of the Byzantine emperor at the close of the 8th cent., and in 800 Charlemagne, king of the Franks, was crowned emperor by the pope. See ROME; BYZANTINE EMPIRE..

The empire was attached to Germany from 962 (when Otto I. was crowned, receiving the title of Holy Roman emperor of the Ger. people) to 1806, although the dignity was elective, and, as in the great contest of 1519, the sovereigns of other lands sometimes became candidates for election. The Byzantine Empire kept alive Gr. civilization, and protected Europe from the hordes of Asia until 1453, when it fell before the Turks. The Byzantine Empire, however, was a mediaeval and Oriental rather than a Roman state, and the fall of the Western Empire in 476 is always taken to be the end of the anc. and beginning of the modern history of Europe.

Christianity became the religion of the Roman Empire in 312; it was preached to the Goths by Ulfilas in 376; the Irish and Franks were converted in the 5th cent., the English, 7th cent., the rest of N. Europe, 8th-13th cent., and Hungary, 10th cent. Christianity and the tradition of empire gave rise to some of the chief characteristics of mediaeval Europe; the conception of a theocratic world-power, of which the spiritual side was the papacy, the temporal aspect the emperor, has been ascribed to the Middle Ages. The struggle of papacy and empire for supremacy in this theocratic government was the chief political fact. The crusades, Gothic arch., and the production of epic and romantic literature are other salient features,

The 15th cent. saw the Renaissance, which largely modified Christian by



THE NEW STATES OF SOUTHEASTERN EUROPE

class. civilization, and in Spain, France, and England the establishment of strong modern monarchies. The 16th cent. swept away the notion of the world-power of papacy and empire, the Reformation being largely an index of the movement to establish independent nations with national churches. The result of the wars of religion, which raged until the Treaty of Westphalia in 1648, was that the principle was established, *Cujus regio, ejus religio.*

The 17th cent. was marked by the decline of Spain, the leader of Europe since the union of its provinces at the close of the 15th cent. by Ferdinand and Isabella. Their grandson, Charles V., ruled over Spain, the Netherlands, and the empire, besides monopolizing the trade with the New World, discovered in 1492 through Span. encouragement. Spain was also the chief Catholic power, and so religious, national, and commercial rivalry united Europe against her.

After the abdication of Charles V. 1555 the empire was settled on his younger son, and so separated from Spain, but for a cent. the Span. and Austrian Habsburgs continued to trouble the 'Balance of Power', a doctrine which now succeeded the mediaeval ideal of a world-empire. Holland successfully secured its independence of Spain, after a fight which exhausted the latter, at the close of the 16th cent.; Elizabethan sailors inflicted great damage on Span. commerce and destroyed her fleets, and the last great war of religion, the Thirty Years' War 1618-48, left the petty Ger. states practically independent of the emperor. Finally France, the natural enemy of Spain, as situated between Spain and the Span. Netherlands, obtained the aid of Cromwell's Ironsides, brought Spain, which had not accepted the Treaty of Westphalia, to sue for peace, and by the Treaty of the Pyrenees 1659, tied the hands of Austria and Spain.

The following period, 'the age of Louis XIV.,' is that of the ascendency of France. This was one of the most glorious periods of Fr. history, but France was fatally weakened by the wars in which Condé, Turenne, Villars, and others conquered Span. and Ger. territory, and at the close of Louis's reign the successes of Marlborough in the War of the Spanish Succession 1702-13, ended with the Treaty of Utrecht, whereby Britain obtained concessions from both Spain and France, and began to come forward as a great power. At the same time Russia under Peter the Great 1682-1725, had become the chief northern power. The Seven Years' War 1756-63 brought important accessions to Brit. territory overseas at the expense of France. By the accession of Louis XIV.'s grandson, Philip of Anjou, to the throne of Spain in 1700, France and Spain had been drawn together, and Bourbon 'family compacts' were a feature of European politics of this time. The revolt of Britain's Amer. colonies 1775 was assisted by both France and Spain, and Brit. ill-feeling against France lasted after the Treaty of Versailles, 1783, by which the independence of U.S. was recognized. Britain, Holland, and the King of Prussia made a Triple Alliance in 1788 to guarantee Holland against Fr. aggression.

The French Revolution in 1789 dwarfed every other European event; the first modern democracy was temporarily established; Napoleon abolished the shadowy Holy Roman Empire (the emperor retaining that title for his Austrian dominions), became dictator on the Continent, and was a perpetual menace to Britain. At last Britain, which had restrained Napoleon by sea and in Spain, succeeded in forming the great European coalition, which brought his empire to an end in 1814. By the treaties of 1815 the Bourbons were reinstated, Lombardy and Venice were made into an Austrian kingdom, and the Austrian Netherlands were annexed to Holland. In nearly every country of Europe monarchs now carried out repressive measures against the beginnings of democratic agitation, Russia, Austria and Prussia forming a Holy Alliance for the purpose in 1915. Risings in Spain and Portugal started in 1820, and the Carbonari movement commenced in Italy. The Holy Alliance successfully put down the Ital. rebels, but, with the defection of Russia to the Gr. side and aid of Britain, the Gr. revolt against the Turks resulted in the establishment of Gr. independence 1827. This war, in which Britain was compelled to play into the hands of Russia, was the beginning of the 19th cent. crusade of Russia against Turkey. The Crimean War 1854-6, showed the dread of the powers of Russian extension in Europe. The July revolution of 1830 in France established the limited Orleanist monarchy overthrown in the year of revolutions 1848. Italy, Hungary, and Vienna itself rose against Austria, Italy becoming an independent kingdom 1861, and Hungary winning self-government under the dual system 1867 of Austria-Hungary.

Britain had to deal with its Chartist movements. The preeminence of Prussia in Germany was shortly afterwards recognized. Prussia had been slowly growing into a strong state since the early 17th cent., and had defeated Austria in her War of Succession. She now joined in the Liberal outcry against Austria; a *casus belli* was found in the Schleswig-Holstein question, and in 1866 Prussia inflicted on Austria the crushing defeat of Königgrätz. From this time Austria becomes more and more an Eastern power. The final step in Prussia's rise to the position of a great power was in her defeat of France and capture of Paris in 1870-1. France had established the second empire under Napoleon III. in 1852, but with the defeat of Sedan 1870, the empire fell, and the third republic was established. In 1871 the King of Prussia was raised to the position of German emperor. An important event of 1870 was the conquest of Rome from the pope by the nationalists. Germany, through the skill of Bismarck, managed to conciliate her fallen foe Austria, and to allay the jealousy of Russia, and in 1872 these three powers made the famous Dreikaiserbund; but Russia soon became restless under Germany's control, and began to draw nearer to France. Austria and Russia joined in aiding the Christians of the Balkan states against Turkey 1877-8, which led (despite the first remonstrances of Britain) to the further dismemberment of Turkey; Montenegro, Rumania, and Serbia becoming independent, and Greece receiving Thessaly. Austria-Hungary was allowed to occupy Bosnia and Herzegovina in 1881, and in defiance of the protests of Britain, France, and Russia annexed the same in 1908. Turkey was also forced in 1878 to promise better treatment of Christians in Armenia, and other reforms—never carried out.

Opposition to Fr. and Russian interests in Africa and the Mediterranean led Italy to join her old mistress Austria in the Triple Alliance with Germany of 1882. Russia was led, by bribe of support against Turkey, to accept Bismarck's proposition of a new alliance in 1884, and Russia, Germany, and Austria made a second league. Neither of the allies, however, aided Russia during the Bulgarian revolution of 1885-6, and the result was a long period of friendship between France (which had never unbent towards Germany) and Russia.

Britain, although interfering in the East to protect the Turk or restrain his atrocities, maintained on the whole a policy of 'splendid isolation' in the second half of the 19th cent., but in 1904 made with France and Entente Cordiale, which covered France's annexation of Morocco, and, by inclusion of France's ally, Russia, led to the Triple Entente, which counterbalanced the Triple Alliance (renewed 1913) in Europe. In the 20th cent. among the most momentous events in European history have been the defeat of Russia by an Asiatic power, Japan 1904-5, the alliance of the Balkan States to drive the Turk out of Europe (see BALKAN WARS), and Germany's rise as a great naval power, challenging Brit. supremacy of the seas. Germany's vast naval and military schemes stirred a feeling of distrust throughout Europe, but the war which she was engineering began through the Balkan troubles that the Balkan wars had left unsolved.

The Eve of the World War.—At this critical period Europe was divided into a number of independent sovereign states. In practice the destinies of the Continent were swayed by the Great Powers—Britain, Germany, France Russia, Austria-Hungary, and Italy. Most of the states were monarchies—virtually absolute in the case of Germany, Austria-Hungary, and Russia. The most northerly group of states, the Scandinavian kingdoms, stood out of the general current; they had no colonies, and since the peaceful secession of Norway from Sweden 1904, their foreign policy was concerned chiefly with maintaining their independence. Denmark could not hope to recover Schleswig by force of arms. The two Netherland kingdoms. Holland and Belgium, both had considerable colonial possessions, and were more deeply involved in the foreign politico-military situation. Holland was exposed to German penetration, and Belgium was pledged to perpetual neutrality in the event of European war. The neutrality of the Swiss Republic was also stipulated. Spain and Portugal were but shadows of their former selves, and could not take an active part in European affairs. The Balkan states, which had succeeded in emancipating themselves from the domination of Turkey, were jealous of one another; and what made the states of the Balkan peninsula the gravest menace to the peace of Europe was that they were aided and abetted in their jealousies by certain Great Powers. Both the Russian and the Austrian courts were dynastic in their Balkan policy; but the Russian interest coincided with a free Balkan League, while the Austrian aim was incongruous disintegration, as leading to Austro-German ascendency.

The Great Powers were arranged in two groups—the Triple Alliance of Germany, Austria-Hungary, and Italy; and the Dual Alliance of Russia and France, with Britain loosely attached. The questions of Alsace-Lorraine, Schleswig, Poland, and the Trentino remained over from past wars as unhealed sores; the subject races of Austria-Hungary were constantly on the point of rebellion; and outside Europe there were suspicions and jealousies between the powers with regard to territorial possessions and concessions in northern Africa and the Near East. The foreign policy of Great Britain was aimed solely at keeping the peace among the nations by compromises and patches. A common civilization, an international commerce, international law, were factors that tended towards the maintenance of peace, while the labouring classes in the various countries endeavoured to foster friendliness by means of 'Internationals.' But the foreign affairs of the states were practically in the unrestrained hands of their executives, and diplomacy was generally secret. The feudal conception of private property in national territory still survived, and nations were bound by treaties regarding which they had never been consulted, and about which they sometimes had not even knowledge. In Germany and Austria diplomacy had an ugly tradition of unscrupulousness and mendacity, and, while the common courtesies continued to be exchanged, the war of aggression which broke upon the world in the opening days of August, 1914, had been long in preparation, and sprang directly out of the Machiavellian diplomacy of the Central Powers.

Territorial and Constitutional Changes following the World War.—During the war a revolution in Russia 1917 led to the establishment of numerous republics in that empire. Of these Ukrainia, White Russia, Lithuania, Latvia, and Taurida are perhaps the chief. Germany, now a republic, has lost Alsace and Lorraine to France, Moresnet and Malmedy to Belgium, territory to the reconstituted Poland in the E.; East Prussia has been separated from West; Danzig has been made a free city; and the N. part of Schleswig-Holstein has reverted to Denmark by plebiscite. Other plebiscites were also taken in E. Prussia and Silesia. The Slavs of Bohemia, Moravia, and Slovakia have set up the republic of Czecho-Slovakia; the southern Slavs have formed themselves into the confederacy of Jugo-Slavia. Austria-Hungary has disappeared from the map, and is represented by the republics of Austria and Hungary, much shorn by the cession of land to Italy, Czecho-Slovakia, Jugo-Slavia, and Rumania, which has nearly doubled her territory. Greece gained territory, afterwards lost to Turkey and lost Salonica to Jugo-Slavia. Bulgaria has access to the Aegean at Dedeagatch. Albania was finally recognized as an independent republic. Turkey in Europe was reduced to a fragment; its frontier was approximately that of the Chatalja lines, but new adjustments made in 1923 greatly modified this situation. See TURKEY, LAUSANNE CONFERENCE.

In few cases are the boundaries of post-war states geographically strong. France, by reaching the Rhine, has lost the strong frontier of the Vosges. The boundaries of Poland are mainly ethnographical, those of Czecho-Slovakia both physical and ethnographical. Rumania has gained territory, but lost the strong frontier of the Carpathians. The separation of E. Prussia from the remainder of Germany is a source of weakness, but all over there have been conflicting interests that have led to compromise in delimitation of boundaries.

EURYDICE (classical myth.), *d.* of Nereus, and wife of Orpheus.

EURYMEDON (*d.* 414 B.C.), celebrated Athenian general who performed distinguished service in Peloponnesian War; killed off Syracuse.

EUSDEN, LAURENCE (1688-1730), Eng. poet and clergyman; made poet laureate 1718; referred to in Pope's *Dunciad.*

EUSEBIUS (Gk. *eusebes*=pious), in the first four cent's. A.D. a common name of churchmen, many of whom have been canonised.

EUSEBIUS OF CAESAREA (264-340), ecclesiastical historian; bp. of Caesarea, and one of the greatest Christian scholars and most prolific writers of his age. His *Ecclesiastical History* which traces the history of the Christian Church from the beginning to the triumph of Constantine, was written *c.* 326. His *Life of Constantine* carries on the story several years later. Amongst his other surviving works are his *Preparation of the Gospel* and *Demonstration of the Gospel,* defences against paganism and Judaism. His *Ecclesiastical History* incorporates many valuable fragments from earlier writers now lost, and his *Onomasticon* deals with the topography of Palestine. Some works survive only in fragments, or in Latin, Syriac, and Armenian versions.

EUSEBIUS OF EMESA, Gk. theologian, pupil of Eusebius of Caesarea; very learned and a student of astronomy.

EUSEBIUS OF LAODICEA (fl. 250), *b.* Alexandria; bp. of Laodicea; noted for orthodoxy and saintliness.

EUSEBIUS OF ROME, pope, 309, but deposed.

EUSEBIUS OF SAMOSATA (*d.* 381), strongly anti-Arian bp.; martyred.

EUSKIRCHEN (50° 39′ N., 6° 48′

E.), town, Rhine prov., Germany. Pop. 12,000.

EUSTATHIUS, Gk. ecclesiastic, abp. of Thessalonica, 1175; student of Homer and Pindar; denounced abuses of his time; author of various works.

EUSTATHIUS (XII. cent. A.D.), Gk. romance writer.

EUTAW SPRINGS, a small stream, tributary to the Santee River in Clarendon co., South Carolina. It is notable for the battle fought on its banks, between the American army under General Greene and the British, under Colonel Stuart, in 1781. The Americans numbered about 2,000 and the British somewhat more. The British forces were defeated and were driven from their camp but returned later and compelled the Americans to retire. During the night the British forces retreated toward Charleston, leaving over 100 killed and wounded, and about 500 prisoners. The American loss was about 550 in killed, wounded and missing.

EUTERPE, family of Central and S. American palms; includes cabbage-palm, *E. oleracea.*

EUTHANASIA, from a Gk. word signifying easy death, is a term used for shortening life in hopeless cases, or dulling the sensibilities of the dying by means of drugs. The first is absolutely forbidden.

EUTHYDEMUS (fl. *c.* 230 B.C.), king of Bactria; famed for his three years' successful resistance of the attacks of Antiochus the Great.

EUTIN (54° 8′ N., 10° 36′ E.), town, Schleswig-Holstein, Germany. Pop. 5,000.

EUTROPIUS (fl. *c.* 350-78), Rom. historian; his *Breviarium Historicoe Romanoe* covers history of city from its foundation to time of Emperor Valens.

EUTYCHIDES (IV. cent. B.C.), Gk. sculptor; famous for statue of Fortune.

EUYUK, EYUK (40° 13′ N., 34° 40′ E.) village, Asia Minor; has interesting ruins of structure belonging to period earlier than that of Gk. civilisation.

EVAGORUS (fl. *c.* 410-374 B.C.), king of Salamis (Cyprus); was associated with Conon, the Athenian, in his defeat of the Spartans at Cnidus 394.

EVAGRIUS, surnamed 'Scholasticus' *c.* 536-600, Church historian; *b.* in Syria; his *Ecclesiastical History* covers the years 431-593, and continues the work of Eusebius and others.

EVANDER (classical myth.), *s.* of Hermes and an Arcadian nymph; is said to have led an Arcadian colony into Italy, some sixty years before Trojan War. Upon the arrival of Æneas at Latium, E. became his ally against the Latins.

EVANGELICAL ALLIANCE (founded 1846), an association of Brit. denominations, to further religious liberty and evangelical principles; has annual conferences and international meetings.

EVANGELICAL ASSOCIATION, a religious denomination founded in Eastern Pennsylvania, in 1800, by Jacob Albrecht, a Methodist-Episcopal preacher. Its converts have been mostly Pennsylvania 'Dutch.' Its doctrines are similar to those of the Methodist-Episcopal Church; it has an itinerant ministry, presiding elders and bishops, the latter elected for terms of four years. A general conference is held every four years. In 1919 there were 1,697 churches and 1,160 ministers, with 154,564 communicants. The pupils in the Sunday schools numbered 198,435, with 24,358 teachers and officials. In connection with the denomination there is a Young People's Alliance, with a membership of about 40,000. During 1920 and 1921 considerable effort was made in missionary work, especially among Italian industrial workers in the coal mining regions. Missions have also been established in China and Japan. The official organs are The Evangelical Herald and The Evangelical Messenger, both published in Cleveland, Ohio. Several hospitals are maintained in Philadelphia, Chicago and other Middle Western cities. The organization also maintains Correspondence College, in Reading, Pa., the Evangelical Theological Seminary, in Naperville, Ill. and several minor theological seminaries.

EVANGELICAL CHURCH CONFERENCE, an assembly of representatives of German Prot. Churches, begun in 1848.

EVANGELICAL PROTESTANT CHURCH, formerly German Evangelical Protestant Church, name given to a group of independent churches of ultra-liberal theology not connected by any constitutional organization. Matters of interest to the denomination are discussed in local district unions. It has 37 churches and 17,962 members. It constituency is almost entirely German.

EVANGELICAL SYNOD OF NORTH AMERICA, formerly the German Evangelical Synod of North America, religious denomination founded in 1840 at St. Louis, Mo. It stands for the principles of the German Reformation, accepts the Bible as the only rule of faith and practice and believes that its teachings are correctly interpreted in the Augsburg Confession, Luther's Catechism and the Heidelberg Catechism. Its General Conference meets every four years. In the interval the affairs of the church are administered by four executive officers and fifteen boards. Statistics published in 1923 give it 1,325 churches and 274,860 communicants. Sunday school pupils number 128,469 with 12,546 officers and teachers. The church property of the denomination is valued at $23,352,076.96. Its latest reported annual contribution for the support and maintenance of its churches was $3,356,385.58. Its expenditures for benevolence in the same period were $419,223.76. It carries on quite an extensive missionary work in the United States and also in India, Honduras and South America. Its main educational institution is the Eden Theological Seminary in St. Louis, Mo. and it also has a preparatory Academy at Elmhurst, Ill. Its official church organ is the Evangelical Herald. It has orphanages, hospitals and old people's homes whose aggregate value is $1,500,000.

EVANGELICAL UNION, a religious sect founded in Scotland, in 1743, also known as 'the Morisonians,' from the founder, the Rev. James Morison, of Kilmarnock, a clergyman of the United Secession Church. He was joined by a number of other clergymen who had been expelled from their churches because of their belief in universal salvation and the freedom of the human will. The denomination maintains the universality of the atonement and the doctrine of eternal personal and unconditional election. At one time it assumed a size of considerable importance, but in 1896 a large majority of the churches joined the Congregational Union. There are about one hundred congregations, nearly all of which are in Scotland.

EVANGELIST (the bringer of good tidings, preacher of the Gospel), a term used in the New Testament, signifying an official of the Christian Church, whose chief duties seem to have been those of a missionary and pioneer, carrying the Gospel message to new places and preparing the way for organising work which was to follow. The E. is not permanently connected with any local field of work, nor is he devoted to the usual service of the pastorate, his work is of an itinerary rather than a local nature. Thus Philip of Caesarea and Timothy of Ephesus are called Es. The term was also used in post-apostolic times for those who read and explained the written Gospels in public worship, but though this has continued to be its distinctive meaning, the official name is more often used to-day in its earlier sense and has been transferred to the writers of the four Gospels.

EVANGELICAL UNION, religious sect which separated from the Secession Church of Scotland in 1843; amalgamated with Congregational Union, 1896.

EVANS, SIR ARTHUR JOHN (1851); Brit. archaeologist; important discoveries in Crete; excavated palace at Cnossos.

EVANS, AUGUSTA JANE (WILSON) (1835-1909), an American novelist; *b.* in Columbus, Ga. Her writings include: *Inez*, a Tale of the Alamo, 1856; *Beulah*, the most popular of her novels, 1859; *St. Elmo*, 1866; *At the Mercy of the Tiberius*, 1887; *A Speckled Bird*, 1902, and *Devota*, in 1907. She *d.* in 1909.

EVANS, FLORENCE WILKINSON (MRS. WILFRED MUIR EVANS), Author, playwright. *B.* in New York, at Tarrytown. Educated at home and took several courses at college. Student at Bibliotheque National and Sorbonne, Paris. Author of 'The Lady of the Flag' and 'Flowers' in 1898; 'The Strength of the Hills', 1902; 'Kings and Queens', 1903; 'Two Plays of Israel', 1904. Some poems in 1905, 'The Silent Door' in 1906. Her play 'Two is Company', was produced at the Empire Theatre, New York in 1902. Writes lyrics and short stories for magazines. Recites and lectures at Wellesley College and Harris Theatre, New York. Member Poetry Society of America, Civic Club. At Columbia College in 1919 was Phi Betta Kappa Poet.

EVANS, SIR GEORGE DE LACY (1787-1870), Brit. soldier; served in Peninsular, Carlist, and Crimean Wars; present at Waterloo, Alma, Inkerman.

EVANS, HENRY CLAY (1851), Amer. College President. Educated at Westminster College, Missouri, 1880 and Doctor of Divinity in 1884. At Synodical Female College was professor Mathematics 1881-1887. In 1883 ordained Presbyterian Minister. 1887-1888 Professor of Greek at Westminster College. Was president in 1888 of Synodical Female College. Was co-editor in 1893 of 'St. Louis Presbyterian'. Pastor of First Church at Kirkwood, Missouri, 1894-1902. President in 1902 of Texas Presbyterian College. Trustee 1893-1895 of Presbyterian Theological Seminary, Louisville, Ky. and Monteagle Sunday School Assembly, 1907. Doctor of Laws at Austin College, 1916.

EVANS, SIR JOHN (1823-1908), Eng. archaeologist and geologist; *s.* of headmaster of Market Bosworth Grammar School; pres., Soc. of Antiquaries, 1885-92; pres., Geological Soc., 1874-76; treasurer of Royal Soc.; K.C.B.1892.

EVANS, OLIVER (1755-1819), Amer. engineer who made valuable experiments in steam locomotion.

EVANS, ROBLEY DUNGLISON (1846-1912), an American naval officer, *b.* in Floyd Court House, Va. He received his appointment to the Navy from Utah, in 1860 and as amidshipman participated in the attack on Fort Fisher. During the Spanish-American War he commanded the battleship 'Iowa,' and with her participated in the blockade of Santiago, Cuba, and in the battle with Cevera's fleet when it emerged from the blockaded harbor. In 1902 he was promoted to the rank of rear-admiral and given command of the Asiatic fleet. During 1905-7 he commanded the Atlantic fleet and as commander-in-chief took it on a tour around the world, in 1907. A year later he retired. His book, 'A Sailor's Log', 1901, which is an autobiography, was very popula rfor some years. He also wrote 'An Admiral's Log,' 1910.

EVANS, SILAS (1876), American College President. *B.* at Scranton, Pa. Educated at Ripon College 1898 and Princeton College in 1900. In 1911 Doctor of Divinity of Carroll College and Middlebury 1913. On Sept. 15, 1901, was ordained Presbyterian Minister at Hastings, Nebr. was Assistant Pastor Hastings College, 1901-9103. Was Professor of Philosophy, 1903-1909. Was pastor and Professor at Park College, Missouri. Taught Hellenistic Greek and Hebrew 1909-1910 at Wisconsin University. Was president of Ripon College 1911-1919. Occidental College, San Francisco 1917-1921. President of Ripon College, since 1921.

EVANSON, EDWARD (1731-1805), Eng. cleric; rector of Tewkesbury, 1769; afterwards became Unitarian minister; wrote on theology and Bible criticism.

EVANSTON, a city of Illinois, in Cook co. It is on the Northwestern and the Chicago, Milwaukee and St. Paul railroads, and on Lake Michigan, 12 miles N. of Chicago. Within it are included the villages of Rogers Park and South Evanston. The city is unusually well laid out and is an attractive residential place. It is the seat of Northwestern University, and has the Garrett Biblical Institute, the Winchell Academy, and the Evanston College for Women. Dearborn Observatory is also here. It forms a department of Northwestern University. The city is almost entirely a residential place for Chicago business men. Pop. 1920, 37,215.

EVANSVILLE, a city of Indiana, in Vandervurg co., of which it is the county seat. It is on the Evansville and Terra Haute, the Louisville, Evansville and St. Louis, the Louisville, Nashville, and other railroads, and on the Ohio River, 185 miles west of Louisville. The city is located on a high bank at a curve in the river, halfway between the falls and the junction of the Mississippi. It is an important trade center of a rich agricultural and coal mining region and has excellent facilities for shipping. It is connected with the Mississippi and Ohio river points by many steamship lines. Its industries include iron and brass foundries, harness and saddlery works, steam engine works, boiler works, furniture factories, boot and shoe factories, and plants for the making of pottery, metal goods, and chemicals. It is the seat of the Evansville Insane Asylum, the St. Mary's, and United State Marine hospitals, county infirmary, and Evans Hall. It has United States government buildings, public day school for the deaf, business college, public library, a high school, bank and daily and weekly newspapers. Pop. 1920, 85,264.

EVARTS, HAL G., (1887), American author; *b.* at Topeka, Kansas. Went to the Topeka High School for two years. Was in various kinds of business until 1913. Raised fur bearing animals and has been trapper and guide in Wyoming. Was member Officers Training Corp. Was at Camp Pike in 1918. Was second lieutenant during World War. Discharged at Armistice. Author of 'The Cross Pull', 1920; 'Passing of the Old West', 1921, and 'The Yellow Horde', 1921.

EVARTS, WILLIAM MAXWELL (1818-1901), jurist, statesman and orator; *b.* Boston, Mass.; *d.* New York City. He graduated from Yale in 1837, then studied law at Harvard and in 1841 was admitted to the bar in New York, where he served as assistant district attorney from 1849 to 1853. He became a leader of the American bar as a member of the law firm of Evarts, Choate and Beaman, and engaged in many noteworthy cases for the government and for corporations. He was chief counsel for Henry Ward Beecher in the Tilden-Beecher case and also defended President Andrew Johnson in the impeachment trial of the latter before the Senate in 1868. After the trial he served in Johnson's cabinet as attorney-general. In 1872 he represented the United States before the Geneva arbitrators who passed upon the Alabama claims. He was also chief counsel for the Republican party before the Electoral Commission which sat in 1877 to determine whether Hayes or Tilden has been elected President. Afterwards he joined President Hayes's cabinet as Secretary of State. Between 1885 and 1891 he was a member of the U. S. Senate.

EVE, in Bible, wife of first man and *m.* of human race; name in Hebrew is *khavvah*, interpreted by *Gensis* as 'life.' Probably original writer of *Genesis* idealised some popular tradition in such manner as to embody certain truths concerning human nature suggested by his own experience. Thus Eve's formation from Adam's rib expresses dependence of weak on strong, while serpent's choice of her indicates her more sensuous nature. Story has been made starting-point of many speculations; Augustine originated discussion as to whether Eve's soul was immediately breathed into her by God, or was taken from Adam; and Milton, in *Paradise Lost*, develops theory that Adam's fall was due to his love for Eve, owing to which he preferred to share her fate rather than be separated from her.

EVELETH, a city of Minnesota, in St. Louis co. It is on the Duluth, the Missabe, the Northern, and the Duluth and Iron Range railroads. It is the center of an important iron mining region and has also important lumbering and dairyipg interests. There is a public library, and other important buildings, parks, etc. Pop. 1920, 7,025.

EVELYN, JOHN (1620-1706), Eng. diarist and author; Surrey gentleman, of Royalist sympathies. His famous *Diary*, covering the period 1640-1706, remained in MS. until 1818.

EVENING SCHOOLS. Schools to furnish education to those who are employed, or otherwise engaged during the day. At first only the rudiments of learning were taught but now they include courses in art, science, and technology, and in some cities are affiliated with the university extension movement. The College of the City of New York conducts an evening college course. Evening schools were first started in Europe by trade associations to help their fellow-workers acquire technical knowledge. There are at present three kinds of night schools (1) Those that supply elementary studies. (2) Vocational schools, for trades and industries for men and women and (3) Higher education. In Germany and Central Europe, the night schools developed from the Sunday School and were first established about the middle of the 19th century, when secular, was added to religious, teaching. Germany and Switzerland have 'Further development' schools for those who have had an elementary edution. These schools are only opened in winter. France has had night schools for 100 years, but for a considerable period they were mainly for apprentices, or technical students, but now many supply higher education. Great Britain opened the first night school in 1908, and Wales followed in 1911. The government aids local efforts financially, but no private profits are allowed. A night school was started in New York in 1834, and though this venture was not permanent other night schools followed, in Boston, and other places and are now to be found in most cities of the United States. In 1920 there were 582 reporting from cities of over 2,500 population. Superintendents, supervisors, and teachers 18,461. Attendance 585,843. Among privately endowed educational institutions that have night classes and supply a wide range of educational and technical courses, are Cooper Institute, New York City, Maryland Institute, Baltimore, and the Drexel Institute, Philadelphia. Successful night schools are also conducted by the Y. M. C. A., Y. W. C. A., Knights of Columbus and many other organizations in the large cities of the country.

EVEREST, MOUNT, peak, Himalayas, frontiers of Nepal and Tibet, India (27° 59′ N., 86° 56′ E.); highest measured mountain in world (29,000 ft.); named after Sir George Everest 1790-1866, Brit. soldier and engineer, who conducted trigonometrical survey of Himalayas. Many unsuccessful attempts have been made to reach the summit. In 1922 a British party, after careful preparation, succeeded in climbing to within less than a mile from the top. A severe storm, and the impossibility of further progress compelled abandonment of the attempt.

EVERETT, a city of Massachusetts, in Middlesex co. It is on the Boston and Maine railroad, and is 3 miles north of Boston, of which it is really a suburb. Until 1870 it was a part of Malden. It was connected with Boston by electrical railroads and has also similar connection with other neighboring cities. It is an important industrial community. It has iron, steel and woolen mills, varnish and chemical works. It has the Whidden Hospital, Shute and Parlin libraries, several private schools, and other public institutions. Pop. 1920, 40,109.

EVERETT, a city of Washington, in

Snohomish co., of which it is the county seat. It is on the Great Northern, the Southern Pacific, and the Chicago, Milwaukee and St. Paul railroads, and on the Snohomish River and Puget Sound. It is connected by freight and passenger steamships with ports on the western coast. Everett is the center of an important lumbering, gardening and mining community. It has an excellent harbor with fine facilities for docking vessels of large tonnage. Its industries include shipyards, paper and flour mills, iron works, and chemical works. It is the seat of Pacific College and has a public library, hospitals, and the United States customs and assayer's offices. Pop. 1920, 27,614.

EVERETT, ALEXANDER HILL (1790-1847), Amer. diplomatist and author.

EVERETT, CHARLES CARROLL (1829-1900), an American clergyman and theological writer, *b.* in Brunswick, Me. Graduating from Bowdoin College, he continued his studies in Berlin, Germany, later being librarian of, and professor of modern languages in, Bowdoin College. In 1859 he was ordained pastor of the Independent Unitarian Church, with a congregation in Bangor, Me. Here he remained for ten years, when he resigned to become professor of theology in the Harvard Divinity School, of which he was dean from 1879 until his death. Among his published works are 'The Science of Thought' 1869; 'The Gospel of Paul', 1893; 'Psychological Elements of Religious Faith', 1902.

EVERETT, EDWARD (1794-1865), an American diplomat, *b.* in Dorchester, Mass. He graduated from Harvard University, in 1811, studied theology and was ordained a pastor of the Uniterian Church, but devoted himself to journalism, becoming editor of 'The North American Review', in 1920. In 1924 he was elected to Congress, as a Whig, serving through several terms for ten years. He was elected governor of Massachussetts in 1835, and re-elected three times following, being defeated then in the fourth election by a majority of only one vote. In 1840 he was sent to England as Minister Plenipotentiary, where he remained for five years. From 1846 to 1849 he was president of Harvard University, and during the last four months of the administration of President Fillmore, in 1852, he was Secretary of State. At the end of this brief term in office he found himself elected to the U. S. Senate, from which he resigned a year later.

EVERGLADES, THE, a great area of swamp lands in the State of Florida, extending about 150 miles long and 55 miles wide, or about 4,000 square miles. It may be described as a wet prairie. Extensive drainage operations undertaken by the State are expected to transform most of the region into fertile fruit and vegetable farms. At the head of the Everglades, or to the northwest, lies Lake Okeechobee, covering an area of some 468,000 acres, to whose overflow has been due the swampy condition of the land. Two reefs of rock border the Everglades E. and W., running parallel to each other, and enclose the pine and swamp lands immersed by the Okeechobee overflows. The soil is chiefly a rich muck and lies in a basin with a rock bottom. The land is level. Because the region has an annual rainfall averaging nearly sixty inches, which has lacked an outlet over the reefs, no rivers penetrating the Everglades beyond these barriers on either side the lands has been too wet for cultivation. The muck overlies sand and rock and varies from about two feet on the edge of the Everglades to 20 feet in the middle. The average of soil depth for the whole territory is about six to eight feet. Over the soil a sheet of water of a depth varying with the land conformation, but rarely higher than three feet, rested generally previous to the drainage work. The whole area grows a tough and coarse grass from eight to ten feet high, having a sharp edge like a saw, and hence called saw grass. Here and there the grass is impenetrable. The land is otherwise free from trees and stumps and almost free from bushes. The grass simply requires mowing down and burning when the soil is ready to be tilled with the running off of the excess water by the drainage canals under construction.

The State legislature created a drainage district embracing the Everglades and containing about 4,300,000 acres. It undertook to carry out a reclamation project that would protect at least three-fourths of this area from overflow by means of outlet canals, laterals and field ditches, so that the reclaimed land could be used for agriculture. The outlay is met by special taxation and runs into several millions of dollars. The work involved lowering the level of Lake Okeechobee by six feet and controlling its flood waters by means of locks and dams. It not only embraced the cutting of a network of canals but also water transportation across the State from the Atlantic side to the Gulf of Mexico, and also irrigation when needed. The canals mostly ran from the lake in a south and south easterly direction with outlets on the Atlantic coast. The main canals have an aggregate length of several hundred miles. They include the Caloosahatchee canal (running westward from Lake Okeechobee), 22 miles; the Hillsboro, 34 miles; the North Canal, 35 miles; North New River, 45 miles; Middle New River, 42 miles; South New River, 58 miles; Miami canal, 48 miles; and the West Canal, 40 miles.

Much of the Everglades land was sold in small parcels before the drainage operations had made much headway and thousands of land owners wait the completion of the reclamation. In 1922 the main canals had been largely completed and awaited the cutting of lateral canals to make the intervening smaller tracts available for cultivation. Most of the development of the Everglades resulting from the drainage has been on its edges, especially in the vicinity of the border cities, Ford Lauderdale, West Palm Beach and Miami, where settlers naturally locate to the near markets, schools and means of transport.

EVERLASTINGS, OR IMMORTELLES, popular name of plants, belonging generally to the *Compositoe*, whose flowers retain their form and colour when dried. The *Helichrysum grandiflorum*, which grows wild at the Cape, and the *Ammobium alatum*, found in New South Wales, are well-known examples. Much used for memorial wreaths, especially in France.

EVERSLEY, CHARLES SHAW LEFEVRE, VISCOUNT (1794-1888), Eng. barrister and politician; M.P. from 1830. Speaker of House of Commons, 1839-57; Viscount, 1857.

EVESHAM (52° 5′ N., 1° 57′ W.), market town, on Avon, Worcestershire, Eng.; scene of defeat of Simon de Montfort by forces of Prince Edward, Aug. 1265. Pop. 1921, 8,685.

EVIDENCE, that which makes manifest; any form of proof. In law, e. is usually either *direct* or *circumstantial.*

In a court of law the 'best' e. only is admissible, and therefore a copy of a letter will not be admitted in e., if the original can be obtained. Similarly a witness must tell what he himself knows, and not what some one else has told him, except in certain cases when *hearsay* e. is accepted. As a general rule, only such matters will be admitted in e. as are relevant to the issue in dispute *i.e.* which tend to prove or disprove the main fact in dispute (which is called the *fact in issue*). Anything that a party to a lawsuit or a prosecution said or wrote is admissible in e., if it is *against* the interests of that party, and if it throws light on the matter in dispute, but it will not usually be admitted if it is in his *favor*. Again, anything which a party has done in the matter which is in dispute, or anything which explains the matter in dispute, will be admitted in e. both *for* and *against* that party. Moreover, when it is important to know the state of a man's mind when he did an act, anything he said or did while accomplishing the act, or anything which he did or said in other transactions, is admissible in e. This is often done when it is sought to prove that a man was insane when he committed a murder.

As opposed to direct e., *circumstantial* e. merely proves surrounding circumstances from which the fact in issue may be inferred. In murder trials this is frequently the only e. available.

Sometimes first-hand e. is not forthcoming, *e.g.* the statements made by the victim of a murder. In that case the dying declaration of the victim will be allowed in e. If the original of a document is lost or destroyed, e. of its contents may be given, as, for example, a *copy* of the document can be put in, or a person may state from memory what the contents of the document were.

Persons guilty of crime may make *confessions*, and such confessions are admissible as e. against them, but not against their accomplices. But such confessions will not be admissible unless they are voluntary, and they will not be deemed voluntary if they are made in consequence of any threat or inducement held out by a person in authority. The prosecutor is deemed a person in authority for such a purpose; so, too, are judges, magistrates, policemen, and other officers of justice. It lies with the prosecution to show that a confession is voluntary; but a confession does not become involuntary by the fact that it was made whilst the accused was drunk though this fact would diminish its value; nor is it involuntary when made under promise of secrecy.

Not every kind of person can be called as a witness, and those called on to give e. cannot be compelled to answer every question put to them. No person can be compelled to give an answer to a question which would render him liable to criminal proceedings. The law will no allow the powers of courts of justice to be employed as a means of extorting confessions of crime. The law, too, regards communications which pass between married couples as privileged. No wife or husband can be compelled to disclose any such communication. O similar nature are the communications which pass between a person and his legal advisers. No lawyer can, without his client's consent, be called upon to disclose any communication that his client may have made to him in his professional capacity; but such communication must not have been made in the furtherance of some criminal object, or the privilege lapses.

EVIL EYE is the name given to the belief that the human eye is capable of malignant influence. Such belief was common amongst ancient nations, and is still very widespread, not only amongst savage races, but many civilised peoples.

EVOLUTION. The general idea of the theory of *evolution*, or, more accurately, the *theory of descent*, is that the earth is peopled with animals and plants which have not sprung up into sudden disconnected existence, but are connected with each other in a long line, or lines, of descent; that no matter how different they appear, all living things are blood relations, descended from simpler and still simpler ancestors.

The theory that life is a long heritage receives support mainly from two sources: the direct evidence of Palaeontology, which has actually traced in a few cases the steps and stages by which one kind of organism has gradually developed into a rather different kind of organism; and the indirect evidence of the geographical distribution of animals, that creatures of a given kind have often an area of greatest abundance—a geographical headquarters—and that, as one recedes from the headquarters, animals are found still showing the head-quarters characters, but less and less predominantly, until these characters are all but swamped in newer developments. Such a series can be satisfactorily explained only on the assumption that all the creatures concerned had a common origination—probably located in the headquarters area, from which they have gradually diverged. The theory of common ancestry gains further strength from the fact that it makes clear many otherwise unaccountable similarities in the embryological developments of different creatures.

Evolution depends on two working causes—the organism itself, and its environment. The first provides the constant variations which are apparent even in the children of the same parents; the second directs, or prunes, or selects these variations. Various theories lay stress upon different aspects of the development of variations and of their interactions with environment. Thus Darwinism holds that exceedingly minute variations occur in all directions round a given mean, and that in the struggle for food and mates those animals with variations which hamper their efficiency are driven out of existence—in other words, that a natural selection is at work which prefers the most efficient variants, that the fittest survive. Such gradual changes in character as Darwin postulated are known as 'continuous variations'; but there also occur 'discontinuous variations,' 'mutations,' or 'sports,' in which a new character suddenly leaps into existence, to persist or be eliminated as selection may decide. But 'variations' arise from other sources than the inherent tendency of the organism to vary, and on those in particular Lamarckism lays stress. The surroundings of an organism may change and induce some compensating change in the animal or plant; or an animal may find a habit—say that of burrowing—useful in some way, and the exercising of the habit may encourage a particular development of (say) short strong limbs, and hard scoop-shaped claws suitable for burrowing. Certainly the unwonted use of an organ leads to its better development (functional modification), just as disuse leads to its degeneration. As the individual is thereby benefited, and if such 'acquired characters' are transmissible (a doubtful point), so also is its progeny likely to persist, thus strengthened for the battle with circumstances.

EVORA (38° 34′ N., 7° 46′ W.), city, the ancient *Ebora*, Portugal; has cathedral, apd.'s see; seat of univ., 1550-1769; cotton cloth, wine. Pop. 16,000.

EVREUX (49° N., 1° 9′ E.), town, Eure, France, with XI. cent. cathedral; textiles. Pop. 18,300.

EWALD, GEORG HEINRICH AUGUST (1803-75), Ger. theologian and Oriental scholar; *b.* Göttingen; first book, on *Genesis*, published 1823; prof. of Philology, Göttingen, 1827-37; prof. of Philology, Tübingen, 1838, of Theology, 1841.

EWALD, JOHANNES (1743-81), Dan. lyrical poet; most famous work the lyrical drama, *The Fishers*, which contains the Dan. national song; and other notable writings are his dramatic poem, *Adam and Eve*, and a tragedy, *Rolf Krage*.

EWE, negro tribe of Slave Coast, W. Africa.

EWELL, RICHARD STODDERT (1817-1872), an American Confederate soldier of the Civil War, *b.* in Georgetown, D. C. He graduated from West Point Military Academy, in 1840, serves actively throughout the Mexican War, but resigned his commission in 1860 because of his sympathies for the Confederacy. He was immediately made a general of the Confederate Army, becoming a lieutenant-general toward the end of the war. At the First and Second Battles of Manassas he commanded a brigade, and he also participated in the battles of Front Royal, Cross Keys, Cedar Mountain and others. After the death of Stonewall Jackson he commanded two corps under Lee, with which he took part in the battles of Gettysburg and the Wilderness. He and his force surrendered to Sheridan at Sailor's Creek, in April 1865, after which he retired to private life.

EWING, JAMES CARUTHERS RHEA (1854), American College President. *B.* in Armstrong co., Pennsylvania. Educated at Washington and Jefferson College, and is a graduate of Western Theological Seminary 1879. Doctor of Divinity, Washington and Jefferson College, 1887 and in 1917 doctor of Literature at University of Punjab. In 1879, ordained Presbyterian minister. As missionary went to India in 1879. 1884-1888 was professor in Theological Seminary in India. 1888-1918 President of Forman Christian College. 1890-1907 at Punjab University was dean of faculty of arts. Was decorated by King Edward of England and again by King George in 1915. Author of books in Indian vernacular.

EWING, JULIANA HORATIA ORR (1841-85), Eng. writer of numerous popular children's stories.

EWING, THOMAS (1789-1871), an American politician. He was admitted to the bar, 1816, and practised law in the courts of Ohio and the Supreme Court of U. S. A. E. was Whig representative of Ohio in the U. S. Senate, 1831-37. He supported Harrison for the presidency, 1840, becoming Secretary to the Treasury, 1841, of the Interior, 1849-50. E. strongly advocated the passing of a bill for a national bank, vetoed by Tyler. He was U. S. senator again, 1850-51. He was a delegate to the Washington Peace Congress. 1861, but throughout the Civil War upheld the Lincoln administration.

EXARCH. (1) Title of viceroy of Byzantine emperor, *e.g.* of Ravenna. (2) Head of an ecclesiastical province or chief see; in Gk. Church the deputy of a legate; generally a bp. (3) Head of Bulgarian Church.

EXCALIBUR, the mystic sword of the legendary King Arthur, which, according to the promise of Merlin, he received from the Lady of the Lake. At his death it was hurled into the lake by Sir Bedivere, where it was received by a hand which rose from the waters.

EXCAVATOR. A machine for digging, loading, and transporting earth used for building, the erection of reservoirs, etc. Two kinds of excavators have practically superseded all others: bridge and steam-shovels. The one is used in a long cutting and operates on rails. A great bucket like a scoop has a stout lever to counterbalance it when filled with dirt. The scoop guided by the operator is forced against the bank and by repeated thrusts is filled, then swung around, the bottom opens and the contents deposited in carts or on a dump. To widen an excavation another excavator is used. This moves on rails laid near the edge of the bank, which is sloped at an angle of 45 degrees. The machine starts at the end of the cutting, where the jib is let down, so that the buckets can cut into the bank when they are dragged up, being filled with clay as they rise, and cars, or wagons are ready to remove their contents. Where rocks are encountered they are first blown to pieces by explosives. These excavators were often used in the World War to dig trenches, and build embankments for earth forts. See Dredging.

EXCELLENCY, title held by colonial administrators, ambassadors, etc.

EXCHANGE, to give one thing for another; to barter; the public building where business transactions are made; to give one person for another, as the e. of prisoners of war; the e. of regiments between officers, etc.

The Stock Exchange is the market for stock and shares in public companies, such as railway, mining, and the great industrial undertakings, debentures, and all the securities for the repayment of loans issued by governments, municipal corporations, and trading companies. The dealers in these securities generally confine their operations to a small section of these securities, and do not deal in any others. Each section constitutes a 'market,' and it is to the market for any particular class of securities that a broker resorts on behalf of a client who either wishes to purchase or sell stocks or shares.

EXCHEQUER, department of British Government which deals with public moneys. Name (Low Latin, *scaccarium*, Fr. *echiquier*) is derived from checked cloth on which money was counted. In early times Eng. E. department was called 'the tallies' from old method of keeping accounts by means of notched sticks.

Court of Exchequer, originally a revenue court, later became ordinary court of law, its judges being known as barons. In 1834 old offices were abolished by Act of Parliament, and new E. under comptroller-gen. came into existence; this however, proved unsatisfactory, and in 1866 the E. as a separate department was entirely done away with, the existing e. and audit department being founded in its place. E. at present day is official style of state revenue.

Chancellor of Exchequer is now first finance minister of Great Britain; he was originally an Under Treasurer appointed to keep counter-roll to that of Lord High Treasurer, and was judge in E. court. Chancellor sat as judge for last time in 1735.

EXCISE, Inland Revenue tax upon dutiable goods; license charges for permission to deal in, or retail, wines, spirits, tobacco, etc.; the department which superintends this taxation.

EXCLUSION BILL. Bill brought before parliament, 1679, to exclude the R. C. Duke of York from the throne; most important political subject of last years of Charles II.

EXCOMMUNICATION, term used for the deprivation of a Christian of the right to communicate, or for entire cutting off from Christian Church. It has parallels both in the Old Testament and elsewhere, and is referred to several times in the New Testament. In the Middle Ages the penalty was frequently inflicted, even kings being excommunicated. Heresy, immorality, or refusal to recognise in any way the Church's authority render men liable to e. It has seldom been resorted to in Prot. countries, but can still be pronounced in England by ecclesiastical courts. It is still inflicted by the R.C. Church on her disobedient children, and in the mission field native converts are excommunicated for immorality. The Scot. Presbyterian Church can exercise the power of e.

EXCRETION, waste product of a plant or animal; differing from a secretion in not being produced for a useful purpose.

EXE.–(1) (50° 37′ N., 3° 26′ W.), river, England; flows through Somerset and Devon and enters Eng. Channel. (2) (37° 47′ S., 144° 36′ E.), river, Victoria, Australia.

EXECUTION.—(1) Act of carrying out the death penalty. (2) In law, the making of a legal instrument valid, *e.g.* the e. of a will or a deed; process of carrying out a judgment of a court; writ by which an officer carries out a judgment.

EXECUTIVE DEPARTMENT. That part of a business corporation that directs or sees to the carrying out of plans and operations, but the term is more often used for administrative divisions in the National and State Government. The Department of State is the chief executive department in the national administration of which the Secretary of State is the head. There are other executive departments for the Treasury, Army, Dept. of Justice, Post Office, Navy, Interior, Agriculture, Commerce, and Labor, charged with carrying out routine business, and laws passed by Congress. Executive power in the United States has two special functions: calling special sessions of Congress, conducting, diplomatic relations with foreign countries, the disposition of military and naval forces, etc., and the administrative which executes statute laws. The President is the head of all the Federal executive departments with power to appoint and remove executives.

EXECUTOR, person whom a testator appoints to wind up his estate and distribute the assets in accordance with the terms of the will. When the deceased has left no will there can be no executors and no probate.

EXEDRA, in classical arch., an out-of-doors semi-circular seat, generally vaulted over; an alcove.

EXEGESIS, word used by Christian theologians for explanation of the Bible with regard to matters of faith and morality; used of literal and allegorical expositions; demands knowledge of original text, and therefore touches textual criticism.

EXELMANS, RENÉ JOSEPH ISIDORE, COUNT (1775-1852), Fr. marshal; served under Murat in Austria and Spain; accompanied Napoleon to Russia.

EXEQUATUR, official document of authority issued by a foreign sovereign to his consuls.

EXETER (50° 43′ N., 3° 31′ W.), city, county town of Devonshire, England, on Exe. Ancient and historic city, believed to have been occupied by Romans; chief market for 'Honiton' lace. Pop. 1921, 59,608.

EXETER BOOK, a collection of XI.-cent. O. E. poetry, etc., preserved at Exeter Cathedral, and containing such poems as *Christ*, *Juliana*, *Guthlac*; pub. by Early Eng. Text Society.

EXETER, EARLDOM, MARQUISATE, AND DUKEDOM OF, titles held by different Eng. families at different dates. John Holland, Earl of Huntingdon, was cr. duke *d.* 1400; executed for conspiracy against Henry IV. Earldom held by Cecil family from 1605-1801, when raised to marquisate.

EXHAUSTIONS. A method used to verify certain mathematical propositions which are formally stated in Book XII. of Euclid, p. 2. A common example is that of finding the area of a circle by taking the areas of circumscribed and enscribed polygons. The circles area lies between the areas of the polygons, and the latter approach near it indefinitely as the number of sides of the polygons is indefinitely increased. Archimedes used this method, which had been attributed to Hypocrates and other ancients. It is, however, essentially a modern idea largely due to Kepler that a circle is a polygon with an immeasurable number of sides.

EXHIBITIONS. INDUSTRIAL. See Expositions.

EXHUMATION, the act of removing a corpse from a burial-place, the authority for which lies in the hands of a coroner.

EXILARCH, hereditary office, held by leader of Babylonian Jews, who were called 'the people of the Exile.'

EXMOOR FOREST (51° 10′ N., 3° 45′ W.), elevated moorland, on S.W. borders Somersetshire and N.E. Devonshire, England; ancient forest.

EXMOUTH (50° 37′ N., 3° 24′ W.), watering-place, at mouth of river Exe Devonshire, England. Pop. 12,000.

EXODUS, BOOK OF, second book of Old Testament; name of Gk. derivation, meaning 'departure.' Naturally divided into three parts; first part (chaps. 1 to 18) is historical, describes enslavement of Children of Israel in Egypt, birth and upbringing of Moses, his mission as deliverer of his race, the ten plagues, institution of Passover, and thedeparture from Egypt; second part (chaps. 19 to 24) is legislative, narrates the giving of the law on Sinai, and confirmation of Mosaic Covenant; third part (chaps. 25 to 40) is chiefly constructive, narrates orders respecting Tabernacle, consecration of Aaron's family as priests, making of Golden Calf and resulting punishment, and finally the building of the Tabernacle. E. shows many traces of Egyptian influence; numbers of Egyptian words occur, and regulations of Mosaic law show influence of Egyptian life. E. is a compilation by various writers from documents of different date, its sources, according to Driver and other authorities, being same as those of *Genesis* (*q.v.*). The sources, P. or the Priests' Code, J, and E, are generally easily recognisable; the last two are not always easily distinguishable in the legislative sections. First eighteen chapters have their source mainly in J and E, with extracts from P in various chapters; chaps. 19 to 24 and 31 (*v.* 18) to 34 (v. 28) are from J and E, except for three verses in chap. 24 ascribed to P. to whom also chaps 25 to 31 (v. 18) and 34 (v. 29) to 40 are due.

EXODUS, THE, the departure from Egypt and journey to Palestine of the Children of Israel, described in *Exodus*, *Leviticus*, *Numbers*, *Deuteronomy*, and *Joshua*. These books are now known to be of composite character, and to have been written long after the events they describe; this accounts for the non-continuity of the story and for the incompatibility of some of the statements.

EXORCISM, ceremony of casting out evil spirits. Important in early Christian Church. R. C. Church has form of service for exorcising demons, and a minor order, 'Exorcists.'

EXOTIC, something of a foreign character; particularly applied to rare foreign plants.

EXPATRIATION, act of compulsory or voluntary exile.

EXPERIMENT STATIONS. See Agricultural Education.

EXPERT, legal term for specialist whose services are employed in courts of law.

EXPLOSIVES are substances which, by the action of heat or other causes, are capable of extremely rapid conversion into gases occupying a very much greater volume than that of the original substance. For more than six centuries gunpowder was the only explosive used. With advance in chemical knowledge many explosive ingredients were discovered—ammonium nitrate (Glauber, 1604-68); picric acid (Woulffe, 1771); potassium chlorate (Berthollet, 1786); mercuric fulminate (Howard, 1779); the perchlorates (Stadion, 1815); gun-cotton (Schonbein, 1846); nitroglycerine (Sobrero, 1846); trinitrotoluene (Wilbrand, 1863).

To begin with, an explosive such as gun-cotton was looked on as completely unreliable until Abel, by long-continued experiments, overcame the difficulties by careful purification 1865-7. In 1863 Alfred Nobel, a Swede, tried to use nitroglycerine, a liquid explosive, for blasting purposes, but there was great danger in the handling. After many experiments he found 1866 that large quantities of nitroglycerine could be absorbed in kieselguhr, a porous sand, yielding a plastic product which he named 'dynamite.' This was much safer to handle. A combination of nitrocellulose and nitroglycerine in a gelatinous mixture, named 'blasting gelatine,' was a further advance; while in 1867 Nobel introduced the use of 'detonators,' consisting of a small quantity of a very violent explosive such as fulminate of mercury.

Cordite is a mixture of gun-cotton, nitroglycerine, and mineral jelly, gelatinized with acetone. Picric acid (lyddite, melinite) and trinitrotoluene (T.N.T.) belong to a different class, derived from coal-tar. They are not suitable for propellants, but can be made to explode violently by use of a detonator. The use of compressed or molten picric acid for shells was introduced by Turpin 1886. Trinitrotoluene did not come into use until the present century, but assumed enormous importance in the World War, both by itself and in admixture with ammonium nitrate. Powdered aluminum appeared as a constituent of explosives in 1900, while liquid-air explosives were generally adopted for blasting purposes in 1914.

Explosives are liable to gradual decomposition even at low temperatures, and in general a rise of temperature of 5° C. doubles the rate of decomposition. Ultimately the heat cannot be dissipated as rapidly as it is produced, and the explosive reaches its 'ignition point'—*i.e.*, the temperature at which explosion occurs. See AMMUNITION, GUNPOWDER, GUN-COTTON, NITROGLYCERINE, TRINITROTOLUENE, ETC.

EXPOSITIONS. Among great exhibitions the World's Columbian Exposition, better known as the World's Fair, held in Chicago, from May to October, in 1893, ranks among the foremost. It commemorated the fourth centenary of the discovery of America. The fair covered 666 acres of land on Lake Michigan. The buildings, numbering 150, were remarkable for their architectural attractions, and were embellished by a wealth of statuary, the work of outstanding American sculptors, including Macmonnies' Columbian Fountain and French's Statue of the Republic. The Exposition produced $33,290,065 in receipts and drew an attendance of 27,539,041.

Preceding the World's Fair was another notable American exhibition held in Philadelphia in 1876, the International Centennial Exhibition, which celebrated the hundredth anniversary of American independence. Nearly 10,000,000 people visited it.

California held a great fair in 1894 in San Francisco as a sequal to the World's Fair to enable foreign exhibitors at the latter to display their products on the Pacific slope. The event is commemorated by the Memorial Museum in Golden Gate Park.

The South next came into notice with an exhibition at Atlanta, Ga., in 1895, to show its agricultural, mineral and manufacturing resources, especially cotton. In 1897 Tennessee followed with an exposition in Nashville celebrating the centenary of that State.

The States west of the Mississippi next assembled their products and other exhibits of their development in a striking fair held at Omaha, Neb., in 1898, known as the Trans-Mississippi Exposition. Buffalo was the historical scene of the Pan-American Exposition, held in 1901, to celebrate the progress of civilization in the Western Hemisphere during the nineteenth century, but the exhibition's success was marred by the shooting of President McKinley (*q.v.*).

The South again came to the front with an exposition at Charleston, S.C., in 1902, to advertise its new industries and commerce, and another at St. Louis, Mo., in 1904 to celebrate the centenary of the acquisition of the Louisiana territory from France.

Oregon organized the Lewis and Clark Exposition at Portland in 1905 as a celebration of the centenary of those two pioneers' explorations in that region.

Other American exhibitions were the Jamestown Tercentary Exposition, held at Hampton Roads, Va., in 1907 under the auspices of the U. S. government, and notable for its marine features and assemblage of warships, American and foreign; the Alaska-Yukon-Pacific Exposition at Seattle, Wash., in 1909 to display the resources of the Pacific Northwest; the Panama-Pacific Exposition held in San Francisco in 1915 as a celebration of the opening of Panama Canal; and the Panama-California Exposition, held in San Diego in the same year with the same object. The Panama-Pacific Exhibition covered about 625 acres on San Francisco bay and was housed in a group of buildings of rich and ornate architecture, while some 250 groups of statuary adorned the grounds. The exhibits at the San Diego fair features the archaeology, ethnology and natural history of the Southwest.

In 1923 Boston had plans under way for commemorating the landing of the Pilgrims at Plymouth Rock by a world exposition in 1925.

Portland, Oregon, looked forward to holding an exhibition in that year to mark the anniversary of the first transcontinental railway and the development of hydro-electric power. Philadelphia projected a celebration of the 150th anniversary of the Declaration of Independence by a great exposition in that city in 1926.

Among principal exhibitions held abroad was the World's Fair in Hyde Park, London 1851, in the original Crystal Palace, an enormous building of glass, save for the framework and flooring, later removed to Sydenham. This great show set the pace for holding such events elsewhere in Europe. London held other exhibitions in 1862 and 1886 and 1921, the last named year's event being the British Industries Fair, held in conjunction with similar fairs in Birmingham and Glasgow.

Paris has always been distinguished for her expositions, beginning with the International Exhibition held in 1855. Her next fair 1867, had enclosed grounds reproducing the domestic life of different nationalities, families being brought from every part of the globe. The exhibition of 1878 surpassed all previous events, only to be outranked by the Universal Exposition of 1889, where the Eiffel Tower rose as the world's highest structure and so remained. In 1900 Paris had another sumptuous fair, which attracted more than 50,000,000 visitors.

Other exhibitions of note were those at Glasgow 1888 and 1901; Milan 1906; Brussels 1910; Turin 1911; Ghent 1913 and Rio Janeiro 1922, the last named celebrating the centenary of the independence of Brazil with American participation through an appropriation of $1,000,000 voted by Congress.

EXPRESS, a transportation service for parcels characterized by greater celerity and safety than that afforded by freight deliveries. Beginning on a small scale and operating in a limited area in 1838-39, it has developed into a vast business whose ramifications extend throughout the world. Adams Express in New England was the pioneer, followed by the American 1841 the United States, 1854; the Wells-Fargo, 1854-55; the National, 1855; and the Southern 1861. These are the leading American companies whose operations are national and international. To the transportation of merchandise, which was the original purpose of the companies, have been added the transfer of money, jewels and securities; the purchasing, selling and collecting of payment for goods; the forwarding of exports and imports and the issuance of letters of credit, money orders, travelers' checks, as well as the transmission of money by telegraph. In a multitude of other ways, procuring of passports, securing ocean passages, buying tickets, etc., they subserve the comfort and interests of the public. Under the law the express companies are common carriers, and their rates are under the control and supervision of the Interstate Commerce Commission, as well as subject to the regulations of railway commissions in the various States. The institution of the Government parcel post system, in 1913 was at first a severe blow to the express companies; but the stimulus this gave to the search for new lines of service and of revenue has restored them to a thriving financial condition.

EXPROPRIATION, act of depriving of proprietary rights. The term is especially applied to a Government action in appropriating, or modifying, personal rights in property.

EXTENSION, AGRICULTURAL. See Agricultural Extension.

EXTENSITY, the preception of space is supposed by many psychologists to develop (mainly through motor activity) out of a vague experience of voluminousness or 'extensity.' Some regard this experience as confined to visual and tactual perception; others think it discernible in all sensation.

EXTENUATING CIRCUMSTANCES extreme provocation, previous good character, etc., urged in defence of a criminal.

EXTERRITORIALITY, in international law, exemptions from law of any state which in special circumstances ar enjoyed by members of a foreign stat within its dominions. These privilege accrue to sovereigns, ambassadors, ar mies, and public ships. Sovereigns unless incognito, are immune fro jurisdiction of foreign country.

EXTORTION, oppressive or illega exaction by a public official or privat person.

EXTRACT, in pharmacy, a concen trated preparation made either b evaporating the juice obtained from plant, or by solution of soluble drie substances.

EXTRACT, BEEF. See Beef Ex tract.

EXTRADITION, the act of deliverin up to the government of a foreign coun try a person accused of committin crime within that country. All civilise countries have e. treaties, and there i generally little hesitation in transferrin criminals.

EXTRAVASATION, passing of fluid through wounds or perforations i vessels of body, *e.g.* escape of faeces fro ruptured intestine into abdominal cav ity, or of blood from split blood vessel as the result of a blow.

EXTREME UNCTION, R. C. sacrament, in which sick persons at the point of death are anointed with oil (Epistle of *St. James* 5_{14}), blessed by bp.

EYCK, HUBERT VAN (*c.* 1370-1426), and **JAN VAN E** (*c.* 1389-1440), Flem. artists; founders of the early Flem. school. They were court painters of Philip, Duke of Burgundy. Their subjects are chiefly scriptural, and, apart from the general excellence of their work, the bro's are credited with the invention of oil-painting, colours having been previously mixed with gums. Examples of their works are to be seen in the London Nat. Gallery, and at Bruges, Ghent, Antwerp, Paris, and other continental cities. Their *s.* Margaret, was also a painter of eminence.

EYE, the organ of sight, the essential part being a globular mass, the *eyeball* contained in a bony cavity of the skull called the *orbit*, communicating with the brain by the *optic nerve*, and moved in the cavity by a set of small muscles, while it has three refractive media through which the rays of light pass, the *aqueous humour* in front, the *crystalline lens* in the middle, and the *vitreous humour* behind.

The Eyeball is an almost perfect sphere, *c.* 1 inch in diameter, the front part bulging slightly forwards. It has 3 coats, the outer protective fibrous covering, or *sclerotic*, being white and opaque, except in the more prominent front part, where it is transparent and forms the *cornea*, a fine canal, the canal of Schlemm, running round the eyeball at the junction of opaque and transparent parts. The sclerotic is containued behind on to the optic nerve, which pierces it. The middle coat consists of the *choroid membrane*, the *ciliary processes*, and the *iris*, the first extending not quite so far forwards as the canal of Schlemm, being deeply coloured with pigment cells, and containing many fine blood-vessels; the ciliary processes extend radially round the eyeball at the junction of the sclerotic and cornea, containing the radiating fibres of the ciliary muscle, whose function is to regulate the lens in accommodating the eye to near objects; while the iris is a thin, coloured curtain hanging in front of the lens of the eye, perforated in the middle with a circular hole, the *pupil*, for the transmission of light.

The inner coat is a delicate structure, the *retina*, which becomes thinner towards the front, the nervous part ending behind the commencement of the ciliary processes, while the pigmented part is continued on to the back of the iris. The retina has two small round marks upon it, one in the middle, called the *yellow spot*, the centre of which is thinned out and is the point of keenest vision, and the other below and to the inner aspect of this, with raised edges and depressed in the middle, called the *blind spot*, which is the point of entrance of the optic nerve. The retina is formed of 8 layers of elements: (*a*) the pigmented layer, composed of pigmented hexagonal flat cells; (*b*) the layer of rods and cones minute nervous structures which receive the impressions of light, the rods being more numerous except at the yellow spot, which has only cones; (*c*) outer granular layer of oval cells; (*d*) outer molecular layer of inter-lacing cell branches; (*e*) inner granular layer of oval cells; (*f*) inner molecular layer of interlacing cell branches; (*g*) layer of large nerve cells; (*h*) layer of nerve fibres, which go to the optic nerve.

The *aqueous humour*, between the cornea and the lens, is composed of water with a very slight solution of albumen and salt, believed to be secreted by the choroid membrane.

The *crystalline lens*, held in position by ligaments from the ciliary processes, is situated behind the pupil, in contact with the iris, making a depression into the vitreous humour behind. Convex on both sides, it is composed of many thin layers of transparent ribbon-like fibres, whose effect is to increase the lens' refractive power. The *vitreous humour* occupies the interior of the eyeball behind the lens, and is a transparent jelly of practically the same composition as the aqueous humour contained within a fine hyaloid membrane.

The muscles which move the eyeball in the orbit consist of the four *rectus muscles*, one above, one below, and one on each side; the *superior oblique* pulls the eyeball downwards and outwards by a pulley; the *inferior oblique* pulls it upwards and inwards. The eyelids protect the eye in front, and are composed of skin, with some fibres of the *orbicularis palpebrarum* muscle, the *sphincter muscle* of the orbit, plates of fibro-cartilage, called the *tarsal plates*, glands which lubricate the edges of the lids, large modified sweat glands (the latter, when inflamed, cause a 'stye'), and a layer of mucous membrane covering the back of the eyelids and the front of the eyeball, called the *conjunctiva*.

The *lachrymal gland* secretes the tears, which bathe and prevent irritation of the cornea and conjunctiva, and lies in the upper and outer part of the orbit, several ducts from it opening upon the upper part of the conjunctiva. The tears are conveyed away by two small canals from the inner angle of the eye communicating with the nose.

Sight.—The rays from a luminous object strike the cornea, and converge from it to pass through the aqueous humour. Those which fall on the farthest out parts of the cornea are shut off by the iris, but the central rays pass through the pupil to the lens, which, having a high refractive index, greatly converges them. The rays then pass through the vitreous humour, and are brought to a focus on the sensitive retina, forming upon it an inverted, but otherwise exact, image of an object. Probably by some chemical change the nervous elements in the retina are stimulated, and this impression is transmitted by the optic nerve to the brain.

The eye, in a position of rest, normally sees distinctly objects about 20 ft. or more away, and it requires to be specially accommodated to very near objects. This is brought about by a change in the lens, the anterior surface becoming more convex, and the posterior surface very slightly more concave, through contraction of the ciliary muscles, which drags upon the suspensory ligaments of the lens.

Astigmatism results from irregularity in the lens or the cornea, causing indistinctness of some parts of the image on the retina, and is cured by the use of suitable glasses; Presbyopia is a failure of accommodation due to the deficiency in power of the ciliary muscle and hardening of the lens in old age. Myopia (*i.e.* near-or short-sightedness) and Hypermetropia (far-sightedness) are due to abnormal shape of the eye, usually hereditary, the globe being lengthened and the rays brought to a focus in *front* of the retina in the former, and *behind* the retina in the latter. See SPECTACLES.

A Stye is due to inflammation of one of the large sweat glands in the eyelid, and is treated by frequent hot-water fomentations; while Blepharitis is inflammation and ulceration at the edges of the lids, with yellow crusts sticking the eyelashes together, for the cure of which yellow oxide of mercury ointment is applied daily. In both, tonics are given and the general health looked after, as they do not usually occur in healthy people.

The conjunctiva is affected by various types of inflammation. Catarrhal Conjunctivitis, a common and simple form, is characterised by reddening of the white of the eye, and by a gummy exudation. It is treated by a mild astringent solution, *e.g.* boracic acid, or silver nitrate, used as a lotion thrice a day. Purulent Conjunctivitis is much more dangerous, and in the form of *Ophthalmia neonatorum*, which attacks newly born children through irritating discharges from the mother, it is the cause of over a third of the blindness in European children. Washing the eyes with solution of silver nitrate, e.g. *argyrol*, immediately after birth prevents its occurrence. Phylctenular Conjunctivitis is a form in which little pustules occur, especially on the margin of the cornea, and should be treated with mild astringent solutions, and by attending to the general health; while in Trachoma or Granular Conjunctivitis reddish granules form, generally on the conjunctival surface of the upper lid, and this type requires treatment, perhaps operative, by a medical man, under whose care, indeed, all eye diseases should at once be put.

Keratitis, inflammation of the cornea, often associated with ulceration, is treated by bathing with boracic acid or silver nitrate solutions and shading the eye from the light; one form of it, *interstitial*, is generally characteristic of congenital syphilis.

Iritis, or inflammation of the iris, arises from many causes, *e.g.* tuberculosis, rheumatism, and is treated by dilating the pupil with atropine; but it may require operative treatment.

Cataract is opacity in the lens, which may be present at birth, or caused by diabetes, by changes in the lens in old age, extension from eye disease elsewhere, or by wounding of the lens; and it can only be cured by an operation.

The retina may be affected by inflammation, bleeding, by the blocking of the arteries supplying it, or inflammation of the optic nerve.

Glaucoma, due to increased tension in the eyeball, affects the retina and causes the person affected to see coloured rings or 'halos' round lights. It is treated by surgical operation.

EYE (52° 18′ N., 1° 8′ E.), market town, Suffolk, England.

EYEBRIGHT (*Euphrasia*), root-parasitic found in Britain, as *E. officinalis*; astringent properties; member of Scrophulariaceae.

EYEMOUTH (55° 52′ N., 2° 5′ W.), seaport village, at mouth of Eye, Berwickshire, Scotland; important fisheries.

EYLAU (54° 22′ N., 20° 40′ E.), town, East Prussia, Germany, near Königsberg; foundries and sawmills; great battle 1807, in which Naopleon defeated Russians and Prussians. Pop. 3,000.

EYRIE OR EYRY, nesting-place of eagle or hawk; also the brood reared there.

EZEKIEL, Hebrew prophet, whose name signifies 'God strengthens me,' or

'God is strong,' was the *s.* of Buzi, and of priestly descent; he was carried off to captivity in Babylonia with Jehoiachim by Nebuchadnezzar in 597 or 599 B.C., and apparently spent the rest of his life in a Jewish colony on banks of the Chebar, about 200 miles N. of Babylon. He began to prophesy about five years after the Captivity, and continued to do so for about twenty-two years. Book may be divided into three parts, of which the first (chaps. 1-24) contains denunciations of the sins of the age and prophecies concerning impending fall of Jerusalem. Second part (chaps. 25-32) consists of prophecies concerning heathen nations of Ammon, Moab, Edom, Philistia, Tyre, Sidon, Egypt. Third part (chaps. 33-48) is full of consolation and promises future restoration, ending with a vision of the Temple. The authenticity of the book has never been seriously impugned.

EZRA, Old Testament character at time of Jews' return from Exile; his work is described in Books of *Ezra* and *Nehemiah.*

EZRA, THIRD BOOK OF. This apocryphal book is called *First Esdras* in the Septuagint and Syriac versions, *Third Esdras* in the Vulgate. It has been compiled chiefly from Book of *Ezra*, with interpolations from *2 Chronicles* and *Nehemiah*; of original additions, story of Darius and three wise men is most remarkable. This book was used by Josephus, and detracts from merit of his history; it is quoted by Athanasius and other early writers. Rejected by Council of Trent.

EZRA, FOURTH BOOK OF. This book is called *Second Esdras* in Apocrypha, and is also variously known as *Apocalypse of Ezra*, *1 Ezr*, *3 Ezra*, and *5 Ezra.* Original text is not extant, byt according to Syriac, Arabic, Armenian, and other versions, book was written in I. cent. A. D. It has no connection with the canonical book, but contains a series of visions dealing with racial and religious questions.

EZRA AND NEHEMIAH, BOOKS OF. These books, which are the sequel to *Chronicles*, were originally regarded as one book in the Hebrew Canon; they are named respectively *First and Second Esdras* in the Vulgate, *Second Esdras* and *Nehemiah* in the LXX. Each may be divided into two parts. First part of *Ezra* (chaps. 1-6) relates return from exile under Zerubbabel, *c.* 536 B.C., and rebuilding of temple, *c.* 516 B.C.; second part (chaps. 7-10) deals with second return under Ezra, *c.* 457 B.C. First part of *Nehemiah* (chaps. 1-7) gives Nehemiah's journey from Shushan, *c.* 144 B.C., and reconstruction of walls of Jerusalem; second part (chaps. 7 (v. 73*b*) to end) treats of restoration of Jewish religion and reform of various abuses. Written chiefly in Hebrew, with portions in Aramaic, books are a compilation; those parts written in first person may be ascribed to personal memoirs of Ezra and Nehemiah respectively, while those in third person are by a later writer whom many authorities believe to have been the author of *Chronicles.*

F

F, 6th letter of Eng. and Latin alphabet, deriving its form from the Greek *digamma*.

FABER, FREDERICK WILLIAM (1814-63), Eng. theologian and hymn writer; became R.C., 1845; wrote many ascetical and devotional works.

FABER, JACOBUS, FABRI (*c.* 1455-1536), French Prot. reformer; trans. New Testament, 1523, and subsequently whole Bible into Fr.

FABER, JOHANN (1478-1541), Ger. R.C. theologian, but partly sympathetic with Reformation leaders.

FABER, JOHN (*c.* 1690-1756), Eng. engraver whose mezzotints of portraits are well known. His *f*., John (*c.* 1660-1721), was also a well known engraver.

FABIAN, ST., pope, 236-50; martyred in Decian persecution.

FABIUS, Rom. patrician *gens*; distinguished members are: Quintus Fabius Maximus Rullianus, six times consul; won victory at *Sentinum*, 295 B. C. Quintus Fabius Maximus Verrucosus, dictator, 221 B. C.; wore out Hannibal and saved the State by masterly tactics drawing on the Carthaginians and refusing to fight; hence called the *Cunctator* (delayer). Quintus Fabius Pictor (fl. 220 B. C.), earliest Rom. annalist; fought in Gallic War; wrote, in Gk., hist. of Rome from the earliest period to his own day. Quintus Fabius Allobrogicus, defeated Allobrogi, 121 B. C.

FABLE, sometimes called 'apologue,' is a fictitious narrative intended to enforce some moral or useful precept, and the characters are generally animals. This form of lit. is of very ancient origin, and many of the earliest f's that have come down to us from the Greeks are supposed to be derived from earlier Buddhist moral stories called *jatakas*. Æsop is generally regarded as the first fabulist, but very little is known about him, save that he is believed to have lived in the VI cent. B. C. At a later period Babrius, a Gk. writer, made himself responsible for the first collection of Æsop. Amongst Lat. writers, the f's of Phædrus, a freedman of Augustus, are noteworthy. The greatest of modern fabulists was Jean de La Fontaine; Florian ranks next to him among Fr. fabulists. Noted Ger. fabulists were Christian Gellert, 1715-69, and Gotthold Lessing, 1729-81. Eng. verse fables have been written by Dryden, Prior, and Gay. Rostand's *Chanticleer* and Maeterlinck's *The Blue Bird* are f's in dramatic form.

FABLIAUX, short moral or satirical metrical tales in old Fr. lit. From one to two hundred still survive, mostly written during the XII. and XIII cent's. Boccaccio, Chaucer, La Fontaine, and later story tellers made free use of the mediæval f.

FABRE, FERDINAND (1827-98), Fr. novelist; deals chiefly with mountain-village life.

FABRE, JEAN HENRI (1823-1915), French entomologist; *b.* Saint Léons, Aveyron. For many years he was professor of natural philosophy at the College of Ajaccio and later at the Lycée of Avignon. But it is as an acute and painstaking student of insect life that he has become famous not only in France but throughout the world. At his place of retirement at Sérignan, he produced the works that have become classics in natural history. His publications include *La science elementaire*, 1862; *Histoire de la buche*, 1866; *Premiers elements de physique*, 1875; *Les inventeurs et leurs inventions*, 1880; *The Life and Love of the Insect*, 1911; *Social Life in the Insect World*, 1912; *The Mason-Bees*, 1914; and *Bumble Bees*, 1915. His masterpiece in ten volumes, *Souvenirs entomologiques*, was published at intervals from 1879 to 1907.

FABRE D'ÉGLANTINE, PHILIPPE FRANÇOIS (1750-94), Fr. dramatist, poet, and revolutionist; guillotined.

FABRIANO (43° 21′ N., 12° 53′ E.), town, Ancona, Italy; paper-mills. Pop. 10,000.

FABRICIUS, GAIUS LUSCINUS (fl. 285-78 B.C.), Roman consul and popular hero; famed for his victories over the Lucanians, Samnites, and Tarentines; censor (275), and distinguished by his promotion of social reforms.

FABRICIUS (ACQUAPEDENTE), HIERONYMUS (1537-1619), Ital. anatomist; prof. of Anatomy at Padua after Fallopius; author of several works on anatomy, specially embryology.

FABRICIUS, JOHANN CHRISTIAN (1745-1808), Dan. naturalist; then prof. of Nat. History and Political Economy at Kiel (1775); made important researches and wrote several works on entomology.

FABYAN, ROBERT (*d.* 1513), Eng. merchant and chronicler; his *New Chronicles of England and France*, first pub. 1516.

FAÇADE, front, or face, of a building generally architecturally embellished.

FACE. See SKELETON.

FACTOR. (1) A constituent element which helps to bring about a particular result. (2) An agent entrusted with the possession of goods for the purpose of selling them on commission. He has an implied authority to dispose of them in the ordinary course of his business, and can bind his principal on a *bona fide* sale, even where he has no express authority to sell.

FACTORIES AND THE FACTORY SYSTEM, on which is based the present modern system of industrial production. The factory system came as a successor to the handicrafts system of industry, whereby commodities were made by individual artisans, sometimes assisted by one or more apprentices, but all working with hand-tools. That method of production had existed undoubtedly from prehistoric times, the development being merely in skill and an increasing variety of commodities. The factory system was introduced as a result of the invention of steam-driven machinery, at first in the textile industries, in England, and completely destroying the handicrafts method in that particular industry by its efficiency and the consequent reduction in the cost of production. Nevertheless, factory production involves other economies than those resulting from the substitution of machinery for hand labor, and it is not inconceivable that it might have been established to a certain degree without the invention of the steam engine. By the handicrafts method the one artisan performed all the labor of producing each separate article. Under the factory system the big advantage of co-operative labor is achieved, in that a group of workers labor together, each concentrating on only a phase of the total and therefore acquiring speed through concentrated proficiency. In a factory each article goes through as many hands as there are processes, each worker performing only one process. Thus a greater number of unskilled workers are available, where formerly practically all were obliged to acquire skill by long experience. The result of factory production has undoubtedly been a great benefit to mankind as consumers, in that commodities have been so reduced in price, through a lowering of costs, that many which were formerly luxuries are now within the reach of everybody. But on the actual workers involved the result has not been so fortunate. The factory system has taken from the individual worker all the possibility of initiative and transferred it to the capitalist owner, who is naturally, inspired by the one motive of profit. It has, therefore, been to his continual interest to seek cheaper labor and since factory production eliminates much of the need of skill, he tends to displace adult men with women and children. There has also been the tendency to crowd the actual factory premises beyond the demands made by good sanitary conditions. These and similar tendencies have had to be continually fought by means of legislation and trades union action, with only partial success. Aside from that, the unskilled, automatic labor of the factory also robs the worker of the pleasure which is inherent in creative work, even though that work be so simple an operation as the production of a pair of shoes. Being associated with only one of the minor processes of the manufacture of the shoes, the factory worker loses interest in the completed product. So pronounced have been the evils of factory labor that many reformers have even suggested and advocated a return to the handicrafts system. The modern reformer, however, sees relief in shorter hours and wider opportunities for healthy recreations and a raising of the general standard of living. According to the U.S. Census Bureau, there were in the United States, in 1919, 290,105 manufacturing establishments, 49% employing less than six persons, about 20% employing from six to 20 workers, about 9% employing from 21 to 50 workers, while only 0.4% employed over 1,000 workers, though these latter constituted one-fourth of the total number of workers. Over 9,000,000 persons were employed in factories.

FACTORY INSPECTION, the investigation of industrial establishments by special government officials to report on the enforcement of the labor laws for the protection of factory workers. Factory inspection first became a government function in England, after 1819, when the first factory laws were enacted and aroused much resentment among factory owners at what they considered unwarranted interference with their private business by the state. In this country factory inspection began in Massachusetts, in 1876, for the enforcement of the laws restricting the employment of children in the textile mills and other manufactories. In 1886 there was organized, in Philadelphia, the International Association of Factory Inspectors, with which, since then, have become affiliated the factory inspection officials of Canada, Massachusetts, New York, New Jersey, Pennsylvania, Rhode Island, Connecticut, Maine, Michigan, Ohio, Minnesota, Illinois, Wisconsin, Missouri and Indiana. This organization holds an annual convention at which constituent members report on new methods and discuss their joint problems.

FACULTY. (1) Term signifying the powers of the mind, such as memory, imagination. (2) Order granted by a bp. allowing an act otherwise illegal; thus any important internal arrangement of church furniture, organ, etc., would necessitate a f. The Court of Faculties, an Abp.'s Court, founded by Henry VIII., now confines its attention chiefly to granting licenses of marriages without publication of banns. (3) The term is also used to designate the collective members of a learned profession, or university, such as the f's of law, science, medicine, arts, etc.

FAENZA (44° 17′ N., 11° 53′ E.), walled city, Ravenna, Italy; formerly famous for Majolica ware, known from name of town as 'faience'; cathedral; silk manufactures. Pop. 14,000.

FAEROE, FAROE (62° 10′ N., 7° W.), islands in N. Sea, between Iceland and Shetland. Capital, Thorshavn, in Strömö. Seventeen out of twenty-two inhabited; coast-line steep, inland flat-topped mts.; currents dangerous, and storms frequent, so that even harbors are insecure, but always free from ice. Produce peat and coal. Industries: sheep-farming, fishing, wild-fowling. Area, 539 sq. miles. Pop. 18,000.

FÆSULÆ (43° 50′ N., 11° 18′ E.), ancient name of Fiesole (*q.v.*).

FAFNIR (Norse myth.), guardian of the Nibelung hoard; slain by Sigurd the Volsung.

FAGNANI, CHARLES PROSPERO (1854-1923), Theologian; *b.* in New York Educated at Columbia College and the College of the City of New York. At Columbia College in 1875 Bachelor of Laws. In 1882 graduated from Union Theological Seminary and Doctor of Divinity 1898 of Western Reserve College. From 1873-1879 taught in public schools of New York. In 1882 Ordained Presbyterian Minister. From 1882-1885 was chapel minister of Grace Mission of Chicago. In Yonkers, New York, from 1885-1886 was pastor of Westminster Church. In 1891 was appointed to instruct in Harvard Divinity School but on account of ill health could not teach, Associate Professor of Old Testament, languages and literature from 1892-1899, and also instructed Hebrew. Professor of Old Testament Literature from 1899-1915 and since 1915 at the Union Theological Seminary. Author of *A Primer of Hebrew*, in 1903.

FAGUET, EMILE (1847-1916), Fr. critic and literary historian; prof. at Sorbonne; member of Academy (1900); pub. studies of great Fr. writers 16th to 19th cent., also a history of Fr. literature.

FAHEY, JOHN H. (1873), Newspaper publisher; *b.* in Manchester, New Hampshire. Had High School education. Began his newspaper work in New Hampshire as reporter and news editor. Until 1893 in New Haven, Connecticut, was editor and later manager of the Eastern Associated Press. From 1893-1897 was editor and day manager of Boston Associated Press, Superintendent of Associated Press in New England from 1897-1903. From 1903-1910 was publisher and editor *Boston Traveler.* From 1909-1910 was 2nd vice president of Associated Press. Publisher and president of Worcester, Massachusetts Post. Member United States section of International American High Commission from 1918-1920. Was on Boston Chamber of Commerce. From 1921-1922 was American Director of International Chamber of Commerce. In 1920 was made Commander of the Order of the Crown, Italy and member of the Legion of Honor.

FAHRENHEIT, GABRIEL DANIEL (1686-1736), a German physicist, *b.* at Dantzig. He lived in England and Holland, studying natural physics, and the manufacture of meteorological instruments. He invented certain improvements in the construction of thermometers, notably the use of quicksilver for alcohol, and devised the scale with freezing-point at 32°, boiling-point at 212°. He was elected a Fellow of the Royal Society of London (1724), and contributed papers to the *Philosophical Transactions.*

FAIDHERBE, LOUIS LEON CESAR (1818-89), Fr. soldier, writer, colonial administrator. Increased Fr. W. African possessions; gov., Senegal, 1854; commanded army of north in Franco-Prussian War.

FAIENCE (Fr.), name given to a kind of fine glazed earthenware, originally made at Faenza.

FAILLY, PIERRE LOUIS CHARLES DE (1810-92), Fr. general; won battle of *Mentana* in Italy against Garibaldi (1867); defeated at *Beaumont* (1870) in Franco-Prussian War.

FAINT or **FAINTING,** loss of consciousness due to weakness of heart's action.

FAIRBAIRN, ANDREW MARTIN (1838-1912), Scot. Congregationalist theologian; principal of Mansfield College, Oxford, till 1909; wrote numerous works, especially on religion, philosophy, and dogmatics.

FAIRBAIRN, SIR WILLIAM (1789-1874), Scot. engineer; along with Lillie built up a famous business in Manchester, and improved mill-works and water-wheels; established shipbuilding yard at Millwall, London; first to build an iron ship; erected Conway and Menai Straits tubular bridges, 1845 (with Robert Stephenson); made steam-boiler improvements.

FAIRBANKS, a city of Alaska, on the Tanana River. It is the most important city of the Territory and is the seat of the Fourth Judicial District of the Government of the Interior of Alaska. Surrounding it is the Fairbanks gold mining district. The city is well built and has churches, schools, hospitals and wireless and telephone connection with outside areas. It is the chief shipping point for supplies to miners. The most important section of the new Alaskan railroad is that running from Chetina to Fairbanks, 312 miles. See ALASKA.

FAIRBANKS, ARTHUR (1864), American educator and writer; *b.* Hanover, N. H. He graduated at Dartmouth College in 1886 and afterward pursued post-graduate studies at Freiburg, Germany. He held professorships at Dartmouth, Yale and Cornell, and from 1900 to 1906 was professor of Greek literature in the State University of Iowa. In the following year he was chosen director of the Boston Museum of Fine Arts. His publications include *An Introduction to Sociology,* 1901; *A Study of the Greek Paean,* 1900; *The Mythology o Greece and Rome,* 1907; *Handbook o Greek Religion,* 1910; *Athenian Whit Lekythoi,* 1907-1914; and *Greek Gods an Heroes,* 1915.

FAIRBANKS, CHARLES WARREN (1852-1918), an American republica statesman, was admitted to the bar i 1874. Twice chairman of the Indian Republican state conventions, he sat fo eight years, 1897-1905, in the Unite States Senate, and was three times a delegate at large to Republican nationa conventions, at St. Louis, Philadelphia and Chicago. From 1905 to 1909 h was vice-president of the United States

FAIRBANKS, DOUGLAS (1883) American actor; *b.* Denver, Colorado He studied in the Colorado School o Mines intending to become an engineer but later abandoned this design and entered the theatrical profession. Hi first stage appearance took place i New York in 1901. In the spoken dram he achieved a reputation in *A Gentlema from Mississippi, Frenzied Finance, Al For A Girl, Hawthorne, U.S.A.,* an other dramas. It is in motion picture however, that he has scored mos heavily. Since 1916 he has headed hi own productions. His most notable film dramas have been *The Mollycoddle, Th Mark of Zorra, The Nut, The Thre Musketeers* and especially *Robin Hood* produced in 1922 with a lavish splendo unequaled hitherto in screen productions In March, 1920 he married Mary Pickford, the motion picture star.

FAIRBURY, a city of Nebraska, i Jefferson co., of which it is the count seat. It is on the Chicago, Rock Islan and Pacific, the Chicago, Burlingto and Quincy, and the St. Joseph an Grand Railroads, and on the Littl Blue River. It is an important industria community and has manufactures. I is surrounded by an extensive frui growing area. The city has a library post office and other public buildings Pop. 1920, 5,454.

FAIRCHILD, CHARLES STEBBINS (1842), American financier; *b.* Cazenovia N. Y. He graduated at Harvard in 1863 and two years later was admitted to the Bar of New York State. In 1874 he was appointed deputy attorney general o New York and in 1876 was elected a attorney general. After spending severa years abroad he returned to New York City in 1880 and practiced law unti 1885. He was secretary of the U.S. Treasury under the Cleveland Administration from 1887 to 1889, and following his resignation became president of the New York Security and Trust Co., which position he held until 1905

He has been a director in many financial and business corporations. and in 1923 was president of the Atlanta and Charlotte Air Line Railroad.

FAIRFAX, EDWARD (*c.* 1580-1635), Eng. author; trans. (in verse) Tasso's *Jerusalem Delivered*, 1600; and wrote a treatise on witchcraft.

FAIRFAX OF CAMERON, THOMAS FAIRFAX, BARON (1612-71), *s.* of above, Eng. soldier; served under Charles I. before outbreak of Civil War, after which became lieut.-general under his *f.*, Lord Fairfax. Became commander-in-chief of Parliamentary forces in 1645; routed Royalists at Langport, 1645; during second Civil War he reduced Kent and forced Royalists to surrender Colchester (1648). Member of Restoration Commission, 1660.

FAIRFIELD, a town of Connecticut, in Fairfield co. It is of the Long Island Sound, and on the New York, New Haven and Hartford Railroad. It is a port of entry and is 52 miles northeast of New York. The town is of great historical interest. It was founded in 1639 and contains a stone powder house and four other buildings constructed during the Revolution. In 1779 it was burned by Governor Tryon. There are the Pequot and Memorial libraries, banks, and other public institutions. Pop. 1920, 11,475.

FAIRFIELD, a city of Iowa, in Jefferson co., of which it is the county seat. It is on the Chicago, Burlington and Quincy, and the Chicago, Rock Island and Pacific railroads. It has important industries including the manufacture of agricultural implements, wagons, pumps, washing machines, brooms, etc. Here is Parsons College. There is a court house, county jail, hospital, park and other public buildings. Pop. 1920, 5,948.

FAIRHAVEN, a town of Massachusetts, in Bristol co. It is on the New York, New Haven and Hartford Railroad, and on Buzzard's Bay and the Acushnet River. It is 60 miles south of Boston and is opposite New Bedford, with which it is connected by bridges. Its manufactures are important and including the making of glass, castings nails and tacks. The town has the Millicent Public Library, banks, churches and a newspaper. The British forces suffered a repulse here by the Americans under Major Israel Fearing, on September 7, 1778. Pop. 1920, 7,291.

FAIRHOLT, FREDERICK WILLIAM (1814-66), Eng. antiquary and wood-engraver; his best-known work is *Costume in England*, 1846.

FAIRIES, supernatural beings, both of good and evil influence; also known by the names of 'brownies,' 'elves,' and various other terms. In popular belief 'good' f's can be helpful in many ways, and their interest is to be encouraged; but 'wicked' f's spirit away children, leaving changlings in their places, and commit various other kinds of mischief. These malignant spirits sometimes assumed the sppearance of beautiful women who lured people to destruction or madness. The belief in f's has been common to all lands and to all periods.

FAIRLIE, ROBERT FRANCIS (1831-85), Scot. engineer; invented double-bogie engine (1864).

FAIRMONT, a city of West Virginia, in Marion co., of which it is the county seat. The city is on both sides of the Monongahela River, and is on the New York Central, the Baltimore and Ohio, and other railroads. The river is spanned by a fine steel bridge. Fairmont has important industries including coal mining and the manufacture of flour, lumber, iron, glass, cigars, etc. Here is the State Normal School, a hospital, training school for nurses, and excellent school buildings are among the public edifices. There is a State Miners' Hospital. Pop. 1920, 17,851.

FAIRMOUNT COLLEGE, educational institution under the auspices of the Congregational Church located at Wichita, Kas. It was founded in 1892 and is coeducational. It has an academic or sub-freshman department and a collegiate course leading to the customary degrees. A conservatory of music is maintained in connection with the college. The library numbers 33,000 volumes. In 1923 the enrollment of students was 389 and the faculty numbered 29 members.

FAIR OAKS, or **SEVEN PINES,** a railway station of Virginia, U.S.A., situated 7 m. E. of Richmond. It is noted as the scene of a battle, in 1862, of the Civil War, when the Union forces under McClellan, gained a victory over the Confederates under Johnston. The former lost 5,031 men, while the latter lost 6,134.

FAIRWEATHER, MOUNT, a mountain on the western coast of North America, in Alaska. It is 14,900 ft. high.

FAIRY RINGS, circular spaces of rich dark grass, nourished by decayed fungi, supposed by the superstitious to be the places where fairies hold their revels.

FAITH may be defined as the assent of the intellect to truths on evidence extrinsic to them; thus we believe in the existence of Mt. Erebus because of our belief in the explorers who have seen it. From this it is clear how large a part f. plays in daily life. *Supernatural* or *religious* f. merely adds to the definition, that the extrinsic evidence is supernatural or religious (*e.g.*), the authority of God who has revealed the truth. Faith has also the sense of a body of beliefs; and, still further, it is often loosely used to describe confidence, trust which indeed presupposes, but is not itself faith. See RELIGION.

FAITH CURE, the doctrine that bodily diseases can be healed without any specific treatment by the faith of the suffering is now widely held, not only by followers of Christian Science, but also, among others, by the sect called the Peculiar People, founded by John Banyard, 1838. Healings at Lourdes and other places of pilgrimage are also by some attributed to faith-healing, and it is not disputed that nervous diseases may benefit in this way. SEE AUTO-SUGGESTION, CHRISTIAN SCIENCE, MENTAL THERAPY, etc.

FAITHORNE, WILLIAM (1627-91), Eng. artist and engraver; produced crayon portraits and engravings of many eminent persons from Charles I. downwards.

FAIZABAD (37° 8′ N., 70° 39′ E.), fortified town, on river Kokcha; capital, Badakshan, Afghanistan; military post.

FAJARDO (18° 20′ N., 65° 40′ W.), town, Porto Rico, on E. coast; commercial center; sugar. Pop. 3000.

FAKHR UD - DIN RAZI (1149-1209), Arab. theologian and historian.

FAKIR, name given to Indian ascetics corresponding to Muhammadan dervishes; some live in monasteries, others are mendicant.

FALABA, Brit. Elder-Dempster liner, torpedoed and sunk by a Ger. submarine S. of St. George's Channel, under circumstances of particular atrocity (March 28, 1915). Passengers and crew were given five minutes to take to the boats, but before the interval had elapsed a torpedo was discharged, and out of the 237 people on board 101 lost their lives.

FALAISE (48° 53′ N., 0° 11′ W.), town, Calvados, France; birthplace of William the Conqueror. Pop. 6700.

FALASHAS, Hamitic tribe in Abyssinia; claim to represent ten lost tribes of Israel, and practise Jewish religion. Hold Abraham's day, day of Covenant, Passover, harvest festival, and Feast of Tabernacle.

FALCON (*c.* 10° N., 72° W.), maritime state, Venezuela; extends along coast on Caribbean Sea; capital, Coro. Area, 9573 sq. miles. Pop. 1920, 128,255.

FALCONER, HUGH (1808-65), Scot. botanist; advised tea-planting and growing cinchona bark in Ind. Empire; saved teak forests from reckless felling; described Ind. fossil fauna.

FALCONER, WILLIAM (1732-69), Brit. poet and sailor; *b.* Edinburgh; drowned at sea; author of *The Shipwreck*, 1673; and the *Universal Marine Dictionary*, 1769.

FALCONIO, DIOMEDE (1842), an Italian prelate, *b.* in Italy. In 1865 he came to the United States as a missionary and remained there in various capacities until 1883, when he returned to Italy. He was made bishop in 1892 and archbishop in 1895. He was an apostolic delegate to Canada and the United States from 1899 to 1916. In the latter year he was made a cardinal.

FALCONRY, a field sport popular among upper classes during Middle Ages, and, though severely checked by civil wars of Charles I., still in existence. F. consists in hunting birds and small animals by means of falcons or hawks. These are either taken from the nest and trained (called *eyesses*), or captured when full-grown and tamed (called *passage-hawks*). When hunting-bird is sufficiently trained, it is taken out hooded to the place where it is to be 'entered at the quarry,' when the hood is removed. Falcons are entered at winged game, hawks at winged and ground game. The females are more frequently used than the male, owing to their superior strength. When a falcon sights its quarry it rises to a height above it and 'stoops' upon it, while a hawk does not rise but flies in a straight line. After killing, the bird is called back by the 'lure,' hooded, and taken back.

FALDSTOOL, reading-desk in Anglican or R.C. churches; folding stool used by R.C. bishops.

FALERII (42° 20′ N., 12° 25′ E.), one of twelve chief cities of Etruria; W. of Tiber, N. of Mount Soracte; destroyed by Rome, 241 B.C.; modern Castellana.

FALERIO (43° 7′ N., 13° 25′ E.), ancient town, Picenum, Italy; modern Fallerone.

FALIERO, MARINO (1279-1355), doge of Venice; executed for plotting to murder nobles and declare himself prince.

FALK, JOHANN DANIEL (1768-1826), Ger. philanthropist and author.

FALK, PAUL LUDWIG ADALBERT (1827-1900), Ger. politician; Prussian Minister of Public Worship and Education; retired, 1879.

FALKENHAYN, ERICH G. A. S. VON (1861-1922), German military commander. He graduated from the German War Academy in 1880, served in China and Eastern Asia and during the Boxer Rebellion (1900). He became Prussian Minister of War in 1912 and shortly after the outbreak of the World War superseded General von Moltke as Chief of Staff. The unfavorable outcome of the Verdun and Somme campaigns in 1916 led to his being removed from that office, and he was placed in command of the northern group of the German armies invading Rumania. His service from that time until the close of the conflict was chiefly in the Eastern zone of operations.

FALKIRK (56° N., 3° 48′ W.), town (parliamentary burgh), Stirlingshire, Scotland, including suburbs of Stenhousemuir, Grahamston, Bainsford, and Camelon; scene of defeat of Wallace by Edward I. (1298), and victory of Prince Charlie's army (1746). Pop. 35,000.

FALKLAND (56° 16′ N., 3° 13′ W.), royal burgh, Fifeshire, Scotland, at foot of E. Lomond Hill. Ancient palace (*c.* 1450-1540) was favorite residence of Stewart sovereigns; James V. *d.* here (1542); restored by Marquis of Bute (1888).

FALKLAND ISLANDS, or **ILES MALOUINES,** Brit. Crown Colony in S. Atlantic (51° 47′ S., 59° 30′ W.), 300 m. E. of Magellan Straits, consisting of E. Falkland (3,000 sq. m.), W. Falkland (2,300 sq. m.), and dependencies of S. Georgia (*c.* 1,000 sq. m.), and other dependencies. See Map S. America. Cap. Stanley (E. Falkland). Coast is irregular, with many excellent harbors; highest point, Mt. Adam (2,315 ft.); many small rivers and lakes: no forests and no coal, peat being burnt; climate bleak but healthy. Chief industry is sheep rearing; coaling station; wool, hides, tallow, whale oil exported. The islands are now the seat of the largest whaling business in the world. At present there are thirteen Norwegian companies engaged in the industry, and one Argentine and three British companies. The aggregate annual value of the products is about $10,000,000. Falkland Islands were sighted by Davis (1592); called after Lord Falkland by Captain Strong (1689); became British (1771), but not permanently occupied by Britain till 1832; used as penal colony for some years; administered by governor. Total pop. 3,400.

FALKLAND ISLANDS, BATTLE OF THE—After the disaster off Coronel (Nov. 1, 1914) the Brit. Admiralty wisely decided to redress the consequences by a concerted effort to hunt down von Spee's squadron, which otherwise might hold up the nitrate trade with Chile, establish a base on the Falkland Islands, or attack Botha's transports while on their way to Ger. S.W. Africa. Two battle-cruisers, Invincible and Inflexible, were detached from the Grand Fleet, and, under the command of Admiral Sturdee, who flew his flag on Invincible, secretly departed from Plymouth at 4.45 p.m. on Nov. 11. From the scanty information available, it appeared that the Ger. squadron had not yet passed the Horn, consequently it was necessary for the Brit. squadron to reach the W. coast of S. America as quickly as possible. Sturdee, therefore, made all speed to reach the coaling station of the Falkland Islands. On the morning of Monday, Dec. 7 his ships entered the harbor of Port Stanley. Early next morning (Dec. 8) the newly-arrived fleet began coaling, but had not completed the operation when at 7.50 the signal station reported that two strange ships of war were approaching from the southward. They were *Gneisenau* (armored cruiser) and *Nurnberg* (light cruiser,) the van of von Spee's squadron; following them were *Scharnhorst* (armored cruiser, flagship of von Spee), and *Dresden* and *Leipzig* (light cruisers,) accompanied by three tenders. At 11,000 yds. range *Canopus* fired with both guns of her fore-turret, but her shots fell short. *Kent* had already been sent to the harbor mouth as a lookout, and *Glasgow* was now ordered to join her. At 10 o'clock as the rest of the squadron proceeded through the minefield, *Glasgow* reported that the enemy ships were steaming southwards as fast as they could. Von Spee had 15 m. start, but by 10.45 was but 12 m. ahead. By 12.50 the battle-cruisers had worked up to 25 knots, and the general signal to engage was made. Von Spee now saw that his light cruisers could only be saved by breaking up his formation. Accordingly he signalled to them to scatter and make for the S. American coast, while he, with the armored cruisers, fought it out to the last. The three light cruisers thereupon made off to the southward (1.25) and were followed by *Glasgow*, *Cornwall*, and *Kent*.

About 1.25 the main action began at a range of 14,000 yds. Gunnery was, however, greatly hampered by smoke, and maneuvering followed. Von Spee closed the range at 2.59 when the action grew hot, both sides securing hits, but the Brit. vessels suffered little damage. By 3.10 the Brit. 12-in. guns had so far asserted their mastery that *Gneisenau* had taken a list and *Scharnhorst* was on fire. By 3.30 the latter vessel 'was a shambles of torn and twisted steel and iron,' and through the gaping holes in her side could be seen a dull red glow as of a furnace. At 4.17 she turned over on her beam-ends and sank with all hands, her flag flying to the last. The battle-cruisers, now assisted by *Carnarvon*, concentrated on *Gneisenau*, which continued firing at intervals until 4.45. A quarter of an hour later she heeled over and sank. Some 200 of her crew were rescued, but many of them failed to survive the shock of the icy cold waters. *Leipzig*, which was chased by *Glasgow* and *Cornwall*, was then still afloat, but she suffered the fate of her sister. *Dresden* escaped, but was ultimately destroyed at Juan Fernandez on March 18, 1915.

FALKLAND, LUCIUS CARY, 2ND VISCOUNT (*c.* 1610-43), Eng. soldier and politician; fought against Scots (1639); member of Short and Long Parliaments; at first supported Parliamentary party; Sec. of State (1642); espoused Royal cause, and killed at Newbury (1643).

FALKNER, ROLAND POST (1866), American economist and statistician; *b.* Bridgeport, Conn. He graduated at the University of Pennsylvania in 1885 and later studied economics at several German universities. He was professor of statistics in the University of Pennsylvania (1891-1900). He was statistician of the United States Senate Committee on Finance in 1891; secretary of the International Monetary Conference in 1892; commissioner of education in Porto Rico (1904-07); statistician for the United States Immigration Commission (1908-11) and assistant director of the Census (1911-12). From 1890 to 1900 he was editor of Annals of the American Academy of Political and Social Science. He has written many articles and brochures on criminology, sociology and economics, and has published a translation of *Meitzen's History, Theory and Technique of Statistics*, 1893; Since 1915 he has been connected with the Alexander Hamilton Institute, New York City.

FALL, ALBERT BACON (1861), American legislator and executive; *b.* Frankfort, Ky. His early education was limited, but he was an omnivorous reader and indefatigable student and fitted himself for the practice of law, being admitted to the bar in 1889. He went West and became interested in land, mining and lumber enterprises, in which he amassed a fortune. He took an active interest in politics and was a member of the New Mexico legislature and associate justice of the Supreme Court of that State. He was elected to the United States Senate as a Republican in 1912; was re-elected in 1918 and on March 5, 1921, was made Secretary of the Interior in the Cabinet of President Harding. He resigned that post, March 4, 1923, in order to devote himself to his business interests.

FALLACY breach of logical rule, though loosely applied to any false statement. Fallacies may be classed as (1) Logical, in the mere form of statement, without regard to the meaning of the terms; (2) Material, concerned with the subject-matter of the argument.

FALLIÉRES CLÉMENT ARMAND (1841), ex-president of the Fr. Republic, is a native of Mézin, dep. Lot-et-Garonne. He was elected a republican member of the Chamber of Deputies from the arrondissement of Nérac (1876), and soon became conspicuous as a speaker and debater. After acting as under-secretary to the interior (1880-2), he was prime minister for twenty-two days (Jan. 1883). He has been twice minister of public instruction and twice minister of justice. In 1890 he became senator, and in 1899 was chosen president of the senate, an office to which he was re-elected eight times. In 1906 he was elected president of the republic, his opponent being Paul Doumer, and held office till 1913. Throughout his career he has been exceedingly popular with the masses owing to his peasant origin and democratic demeanour.

FALLMERAYER JAKOB PHILIPP (1790-1861), Ger. traveler and historian; traveled in East; best known for hi views on Slavonic origin of modern Greeks.

FALL OF BODIES. See GRAVITATION.

FALLOPIUS GABRIELLO FALLOPIO (1523-62), Ital. anatomist; prof. of Anat. in Ferrara, in Pisa, and afterwards in Padua; made several anatomical discoveries, and author of an early and valuable work on anat. Fallopian Tubes. See GYNECOLOGY.

FALLOUX FREDERIC ALFRED PIERRE, COMTE DE (1811-86), Fr. hist. writer and politician; Minister of Public Instruction; Member of Académie Française.

FALLOW land left untilled, or unsown for a year or more, for the purpose of giving rest to the soil.

FALLOWS SAMUEL (1835-1922), American clergyman; *b.* Pendleton, Lancashire, England. He came to this country when he was 13 years old and graduated at the University of Wisconsin in 1859. He was ordained to the ministry of the Methodist Episcopal church in the latter year, and held various pastorates in that denomination until 1875, serving during the Civil War in the Union army. In 1875 he became rector of St. Paul's Reformed Episcopal church in Chicago, and was made bishop the following year. For two years he was president of Wesleyan University (1874-75). He was chairman of the Educational Congress at the Columbian Exposition; held various posts in the organization of the G.A.R., and has been extremely active and prominent in civic affairs and national celebrations. In 1919 he was chairman of the Grant Memorial Commission. His publications include *Life of Samuel Adams*, *Students' Biblical Dictionary*, *Past Noon*, *Splendid Deeds*, *Supplemental Dictionary of the English Languages* and *Health and Happiness*, 1908.

FALL RIVER a city of Massachusetts, in Bristol co. It is on the New York, New Haven and Hartford Railroad, and at the mouth of the Taunton river, where it empties into Mount Hope Bay. Fall River is an important commerical city and is connected with New York City by steamers which discharge their passengers there for transmission to Boston. There is an excellent harbor which is capable of admitting the largest vessels. A stream called Fall River is the outlet of Watuppa Lake and has here a fall of nearly 130 feet in less than one-half mile. This affords excellent water power for the industries of the city. Fall River has a total area of 42 square miles. It is built on high land and is well laid out. There are many handsome private houses built largely of granite, which is found in the vicinity. There are many educational institutions, including Durfee High School, Notre Dame College, Fall River Conservatory of Music, and a civil service school. There is a public library, and several circulating libraries. In the city are over 50 churches. It is connected with neighboring cities and towns by electric railways. The city is one of the most important industrially in New England. It is the largest cotton milling city in the United States. This industry employs over 40,000 people and over 40 million dollars capital is invested in it. In addition there are manufactures of machinery, food preparations, clothing, woolen goods, drugs, paints, clocks, rubber, boots and shoes, etc. Fall River was originally a part of Freetown but was separately incorporated in 1803. It received a city charter in 1854. Pop. 1920, 120,485.

FALLS, DE WITT CLINTON (1864), American artist and author; *b.* New York City. He was educated in private schools, enlisted in the army in 1886 and saw service in the Spanish-American War and on the Mexican border. He became colonel of the 7th Infantry. New York Guard in 1917. He served on the General Staff in the World War and was made lieutenant colonel in 1919. He was an observer with the Russian army in the Russo-Japanese War. He is a distinguished marksman and won the Palma trophy at Bisley, England, in 1903. His publications include *Mishaps of an Automobilist*, 1900; *The Journey Book*, 1910; *Chief Courageous*, 1913; *Mobilization of the Armies of Belgium and England* (special report to War Department), 1914, and *Army and Navy Information*, 1917. He has devoted much time to the illustration of books.

FALMOUTH, a city of Massachusetts, in Barnstable Co. It is on the New York, New Haven and Hartford railroad, and on Buzzards Bay and Vineyard Sound. It is situated on the extreme western end of Cape Cod, and is 50 miles southeast of Boston. Surrounding it is an important agricultural and cranberry growing region. Here is Wood's Holl, which is a hatchery and research station of the United States Fish Commission. Pop. about 5,000.

FALMOUTH (50° 7′ N., 5° 3′ W.), seaport, Cornwall, England, on S. side of estuary of Fal; has excellent harbor, defended by castles—Pendennis on W., St. Mawes' on E.; headquarters of

Royal Cornwall Yacht Club; fisheries; shipbuilding; engineering. Pop. 1921, 13,318.

FALSE POINT (20° 20′ N., 86° 46′ E.), cape, port, and lighthouse, Cuttack district, Bihar and Orissa, India.

FALSE PRETENSES, the obtaining of goods by this method means that they were obtained by false representation made either verbally, by writing, or by conduct which is calculated to deceive.

FALSTER (54° 50′ N., 12° E.), Dan. island in Baltic Sea; *c.* 27 miles long; area, 183 sq. miles; agricultural. Pop. *c.* 35,000.

FALTICENI (47° 28′ N., 26° 16′ E.), town, Suceava, Rumania; large annual horse and cattle fair. Pop. 10,000.

FALUN (60° 33′ N., 15° 35′ E.), town, Sweden; famous copper mine. Pop. 1921, 12,719.

FAMA (classical myth.), the goddess of rumor.

FAMAGUSTA (35° 7′ N., 33° 57′ E.) seaport town, E. coast of Cyprus; near ruins of Salamis; important in Middle Ages; taken by Richard Cœur de Lion, 1191; by Turks, 1571. Pop. 3,400.

FAMILIAR, spirit or demon supposed to be in attendance on a necromancer; attendant attached to household of the pope or R.C. bp's; an official of the 'Holy Office' (Inquisition).

FAMILISTS ('Family of Love'), Dutch sect, founded by Joris and Niclaes in XVI cent.; held that love was essential character of religion.

FAMILY, as the word is now understood, means the father, mother, their children, and other kindred. This modern conception of the term is derived from the ancient patriarchal form of f., in which the eldest male was essentially the 'father of the family,' and exercised supreme powers over his wife, or wives, their children, and the husbands and wives of the children, during the entire length of his days. It has been assumed by some writers that the patriarchal form was preceded by a promiscuous state, when sexual relations existed between persons of near kin. As opposed to this theory there is plenty of evidence regarding *exogamy*, associated with totemism, which prohibited marriage between members of the same tribe (i.e. *endogamy*). Arising out of the prohibition demanded by the custom of exogamy there came into existence the *beenah* form of marriage, of which there are numerous examples in the Bible. By this method a woman of one tribe received a lover, or lovers, from another tribe, and all children born of the connection became the property of the mother's tribe. Often, however, the father forsook his own tribe and was formally received into that of the mother of his offspring. Marriage by capture, or by purchase, was also contemporaneous with the *beenah* form of marriage. The term *family* is also used by botanists and zoologists to describe trees, plants, or animals belonging to a particular genus.

FAMINE, distress and starvation caused by dearth of food; may be caused by failure of harvest owing to insect pests, drought, or other unfavorable weather conditions, or by war, excessive taxation, insufficient means of transport, or other difficulties in distributing food supplies. India's liability to famine, which has occurred at intervals throughout the Christian era (*e.g.*, 1022, 1344, 1770, 1790, 1876, 1900), is chiefly due to intensely tropical climate; preventive measures include promotion of irrigation, better transport, and agricultural improvements. Great famines occurred at Rome, 436 B. C.; in Egypt, 1064–72; in England, 1005, 1069; Ireland, 1822, 1846-7; China, 1877-8, 1888-9; Russia, 1891-2, 1905. Great modern famines have been those in China in 1920–22, and in Russia, 1921-23.

FAN, an implement used for producing coolness in the atmosphere, and upon the skin. Feather f's upon long handles were used by the ancients, and were regarded as symbols of royalty. In the Middle Ages f's were used in churches to keep flies from the consecrated elements. Small feather f's began to be used in England during Elizabeth's reign. The modern folding f. is of Jap. origin. From the XVII. cent. onwards France has been the chief seat of the f. industry.

FAN, SIROCCO. See Blowers, Electric.

FANCY, passive imagination, in which the sequence of images and thoughts is casual and not the development of a plan.

FANEUIL HALL, building in Dock Square, Boston, Mass., which has gained the sobriquet of 'The Cradle Of Liberty' because of the frequent meetings of patriots held there during the Revolutionary period. It was completed in 1742 as the gift of a public-spirited citizen, Peter Faneuil and consisted of two stories—the lower floor being used as a market while above was a hall for assembly purposes. It was burned in 1761, rebuilt in 1763 and used as a theater during the British occupation of Boston. It was doubled in size in 1805 when a third story was added and a side wall set back, enlarging its capacity to 3,000. Many of the greatest addresses in American history have been made there by Webster, Choate, Sumner, Everett, Wendell Phillips and others.

FANEUIL, PETER (1700-43), American merchant; *b.* New Rochelle, N. Y. He was of French Huguenot descent. He amassed considerable wealth in commercial operations in Boston, Mass., and in 1740 built as a free gift to the city a public hall, of which the lower part served as a market. The structure, named after him, was erected in the two following years and has gained historic fame as the scene of some of the most notable mass meetings in American history. See FANEUIL HALL.

FANNERS, apparatus for winnowing grain; current of wind blows away chaff; first machine f. built in 1737.

FANO (43° 50′ N., 13° 2′ E.), town, Italy, on Adriatic Sea; cathedral; remains of triumphal arch of Augustus; ancient *Fanum Fortunae.* Pop. 11,000.

FANSHAWE, SIR RICHARD (1608-66), Eng. diplomat and poet; Royalist in Civil War; after Restoration was ambassador to Portugal and Span. courts; trans. Camoen's *Lusiads* and other poems. His wife, Lady Fanshawe, wrote remarkable *Memoirs.*

FANTASIA, musical composition of free or original design; term loosely applied to medley of popular tunes, a favorite type of music with mediocre pianists.

FANTI, native race of African Gold Coast; polygamous; marriage is by barter, but women are held in much regard; skilled artificers; fetish worshippers.

FANTI, MANFREDO (1806-65), Ital. soldier; commanded division in war between Austria and Piedmont, 1859; War Minister, 1860; commanded army in Papal States and subdued Umbria, 1860.

FANTIN-LATOUR, IGNACE HENRI (1836-1904), Fr. artist.

FANUM FORTUNÆ (43° 50′ N., 13° 2′ E.), ancient town, Umbria, Italy; celebrated temple of Fortuna, whence the town's name; modern Fano.

FAN VAULT, in arch., decorative kind of vaulting resembling an open fan.

FARAD, unit of electrical capacity; capacity of condenser giving difference of potential of 1 volt when charged with 1 coulomb; for practical purposes the *microfarad* (a millionth of a farad) is of more suitable size.

FARADAY, MICHAEL (1791-1867), Eng. physicist; originally a bookbinder's apprentice, F. was app. assistant in the Royal Institution Laboratory on Davy's recommendation; worked there for fifty-four years; after 1833 as Fullerian Prof. of Chem.; experimented on the diffusion and liquefaction of gases and on the alloys of steel, and introduced the ideas of *polymerism* and *isomerism.* He discovered the induction of electric currents, the identity of electrification produced by different methods, and the different capacities of substances for participation in electrical induction. He was the first to recognize the chemical decomposition set up by an electric current, and to detect the rotation of the plane of polarized light in a magnetic field. He discovered the continuous rotation of magnets and wires conducting an electric current round each other.

FARAH (32° 30′ N., 62° 10′ E.), town, Afghanistan, on river Farah; ancient *Phra*; river flows into Lake Hamun.

FARCE, humorous dramatic work broadly comic in design, and depending upon ridiculous, sometimes clownish, situations for its effects, in which it differs from 'comedy,' a more witty and refined class of play.

FAR EASTERN REPUBLIC OR FAR EASTERN DEMOCRATIC REPUBLIC, a republic established in the southern part of Siberia from Lake Baikal east to the Sea of Okhotsk on the Japan Sea. It has an area of about 650,000 square miles and includes the former provinces of Transbaikalia Amur and a maritime province. On the south are Mongolia and Manchuria. In spite of demands on the part of Japan to prevent the continued existence of the republic, it persisted. It is governed by a commission of seven, elected by the national assembly of about 400. Both men and women have the suffrage. Education is free and compulsory. The republic came, in 1922, under the influence of the Soviet government of Russia. The capital is Chita, and the chief commercial city is Vladivostok.

FAREHAM (50° 52′ N., 1° 10′ W.), market town and watering-place, Hampshire, England, on Portsmouth Harbor; earthenware. Pop. 10,000.

FAREL, GUILLAUME (1489-1565), Fr. reformer; preached Reformed doctrines in Switzerland; led Reformation party in Geneva, 1534, but was expelled with Calvin, 1538; *d.* Neuchâtel.

FAREWELL, CAPE (59° 44′ N., 43° 54′ W.), most southerly point in Greenland.

FARGO, a city of North Dakota, in Cass Co., of which it is the county seat. It is on the Chicago, Milwaukee and St. Paul, the Northern Pacific, and the Great Northern railroads, and on the Red River. It is opposite Moorhead, Minn. The city has important industries, including car shops of the Northern Pacific railroad, flour mills, paper mills, grain elevators, knitting mills, and brick yards. It is the seat of the United States land office and of Fargo College, and the State Agricultural and Mechanical College. There is an excellent school system, including a high school, banks, hospitals, parks and newspapers. Pop. 1920, 21,961.

FARGO COLLEGE, coeducational institution in Fargo, North Dakota, under Congregational auspices. It was founded in 1888 and comprises a collegiate department and classical and scientific courses, with preparatory and commercial departments and a conservatory of music. It has a library of 9,000 volumes. In 1923 it had an enrollment of 490 students and the faculty comprised 21 members.

FARGO, WILLIAM GEORGE (1818-1881), American capitalist; *b.* Pompey, N. Y. He learned the fundamentals of the express business as agent for the Pomeroy Express Co. in Buffalo, N. Y., in 1853, and the following year established an express business of his own which later developed into the Wells-Fargo Express Co. He became president of this organization in 1868. An event which gave him great national prominence at the time of the Civil War was his action in continuing the wages of all his employes who enlisted in the Union cause.

FARIBAULT, a city of Minnesota, in Rice co., of which it is the county seat. It is on the Chicago Great Western, the Chicago, Rock Island and Pacific, and the Chicago, Milwaukee and St. Paul railroads, and at the junction of the Cannon and Strait rivers. The city is important industrially and has manufactures of pianos, carriages, furniture, boilers, foundry products, gasoline engines, etc. It has also canneries, flour and woolen mills. The important public buildings include a court-house, city hall, and a public library. Among the public institutions are the Shattuck Military School, Seabury Divinity School, the State Schools for the Deaf, Blind and Imbeciles, Bethlehem Academy for Girls, and St. Mary's School for Girls. Pop. 1920, 11,089.

FARIDKOT (30° 40′ N., 74° 46′ E.), native Sikh state, Punjab, India; chief town, Faridkot. Area, 642 sq. miles. Pop. 130,000.

FARIDPUR (23° 36′ N., 89° 53′ E.), town and district, Dacca division, Bengal, India; chief product, rice. District: area, 2,281 sq. miles; pop. 1,950,000. Town: pop. 11,000.

FARINELLI, CARLO BROSCHI (1705-82), celebrated Ital. singer; enjoyed highest favor at Span. court under Philip V. and Ferdinand VI.

FARINGDON, GREAT (51° 30′ N., 1° 36′ W.), market town, Berkshire, England.

FARINI, LUIGI CARLO (1812-66), Ital. politician and writer; carried out negotiations with Napoleon III.; helped to unite Central Italy with Piedmont; premier, 1862-63.

FARLEY, JOHN MURPHY (1842-1918), American Roman Catholic prelate; *b.* Newton-Hamilton, Ireland. His classical studies were begun at St. McCarten's College, Ireland, and completed at St. John's College, Fordham, N. Y. Later he pursued ecclesiastical studies at Troy, N. Y., and Rome, Italy, in which latter city he was ordained as a Roman Catholic priest in 1870. In the same year he returned to this country and was assigned a parish in Staten Island. He became private secretary to Cardinal McCloskey in 1872; was made a monsignor in 1884, vicar-general of the archdiocese of New York in 1891 and domestic prelate to Pope Leo XIII. in 1892. In 1902 he became archbishop of New York and in 1911 was created cardinal by Pope Pius X. Under his administration great progress was made by the Roman Catholic Church in the metropolis. He was a leader in all movements looking toward the betterment of social conditions. He wrote the Life of Cardinal McCloskey and contributed many articles to church and secular magazines.

FARMAN, HENRY (1875), Fr. designer and builder of aeroplanes; of Brit. extraction; in early life was a champion cyclist, and afterwards opened a motor-car business; still owns largest garage in Paris, the Palais de l'Automobile; was greatly interested in aviation, making his first trials in 1907-8, and winning the prize of 50,000 fr. offered for the 'first kilomètre boucle;' won all the prizes of the time, including the Grand Prix de Reims, first official meeting; was the first man to fly alone and with passenger across country, and to fly a hundred miles, 1909. He established works at

illancourt to supply machines to the
r. army, and also to those of other
ountries.

FARM ANIMALS, FEEDING. The
alue of the feed consumed is the prin-
pal item of expense in producing farm
nimals. Fully two-thirds of the cost
f producing milk in winter is the cost of
e feed. In fattening cattle and hogs
ore than three-fourths of the cost is
epresented in the feed bill. A herd of
ows in Wisconsin produced under official
st almost twice as much milk and
utter in a year when fed by one owner
s when fed by another. Dr. E. C.
ckles, of the University of Minnesota,
authority for the statement that the
oor returns obtained from dairy cows
the United States, compared with
ose of several other countries, is less
e to poor breeding than to poor
eding. In feeding stock, as in every
her business enterprise, where the
rincipal expense is, there the oppor-
nities for making savings are greatest.

Some foodstuffs are more easily and
lly digested than others; as for
ample, milk is completely used while
more than a fourth of such coarse
dders as wheat straw and corn stover
digested. Grains, such as corn and
ill feeds are quite easily digested and
lly four-fifths of their total content
made available. Hays, like clover,
mothy, and alfalfa are somewhat more
an half digested and a green pasture
ass is very easily digested and is largely
ilized.

THE ESSENTIAL CONSTITUENTS OF
EEDS: There are four essential con-
ituents of feeds—(1) Protein, (2)
arbohydrates, (3) Minerals, (4) Vita-
ines.

(1) *Proteins.* This is a group of sub-
ances essential to the life and growth
animals and the repair of their bodies.
is also a necessary part of the feed
r the production of milk, eggs, wool,
d feathers. Protein is sometimes
oken of as the blood and muscle mak-
g part of feeds.

While animals require only about 1
rt of protein to 6 or 7 parts of starch
d sugars, yet so scarce is protein in
ture that even this small amount is
ually the most expensive part of
dinary foodstuffs.

Among the feeds rich in proteins are
e by-products of manufacture such as
eat meal and tankage from the packing
uses; skimmed milk and buttermilk
om dairy industry; cottonseed meal,
seed meal, wheat bran, and wheat
iddlings from the milling industries;
eds such as beans and peas, and the
ys made from clovers, cowpeas, soy-
ans, and alfalfa.

(2) *Carbohydrates.* In animal nutrition carbohydrates include the digestible starch, sugar, fat, and woody fibre of the feed. The uses of this group of substances are three-fold: First, to supply heat with which to keep the animal body warm; secondly, to supply energy for work such as walking about to gather food, grinding and digesting food, and performing labor as the horse does when it pulls the plow; thirdly, for building fat to be stored in the body, in milk, in eggs, in feathers, and in wool.

Cereals such as corn, oats, barley kafir, milo, sorghum, and grass forage crops are the principal sources of carbohydrates. These being among our principal farm crops, carbohydrates are comparatively abundant and cheap.

(3) *Minerals.* The mineral elements of feed supply the building material for the bony structure of the body; add palatable, laxative, and stimulative properties to the ration, and furnish essential constituents of the digestive juices. Almost 70 per cent of the mineral required by animals is calcium, some 27 per cent is phosphorus, and about one-half of 1 per cent is magnesium. The shell of an egg is almost pure calcium carbonate.

The grains used so largely as feeds, such as corn and grain sorghums, are notably deficient in minerals. Coarse fodders such as hay and pasture grasses are relatively rich in minerals. Legumes like alfalfa, red clover, sweet clover, soybeans, and cowpeas are comparatively rich in minerals. Straws and corn stover are low in these elements.

When farm animals had a wide range and access to a great variety of feeds there was little need to consider the mineral part of the ration, but now that many farm animals, particularly hogs, dairy cows, and hens are closely confined and are fed largely on grains that are low in minerals, this part of the ration has become quite important.

Placing a mineral mixture containing common salt, finely ground limestone, or bone flour and sulphur where it will be accessible at all times to the farm animal is a growing practice.

(4) *Vitamines.* Exactly what part vitamines, a newly discovered and comparatively little understood group of substances in feeds, play in nourishing the animal body is not known but we do know that if vitamines are not supplied to young animals they quickly stop growing and soon die. Also that if the feed of grown animals is lacking in these substances old age soon sets in, and the animals speedily die.

Vitamines are found in a variety of feeds but most particularly in the leafy part of plants, butterfat, cod liver oil, yellow corn, yellow sweet potatoes, carrots, and ripe peas. By giving animals a great variety of feeds and especially leafy hays such as those made from clovers or alfalfa and access to green pastures as much of the time as is possible their vitamine requirements will be fully satisfied.

FARM LOANS ACTS, Federal legislation which authorizes the financing of agricultural enterprises with the support of the Federal Government. The original act was passed in July, 1916, and provides for the issuance of farm loan bonds through a Bureau in the Treasury Department for financing a nation-wide farm mortgage system. The Bureau is under the administration of a Federal Farm Loans Board, including the Secretary of the Treasury, ex officio, the chairman and four members, appointed by the President with the approval of the Senate. One of these, with the title of Commissioner, acts as chief executive. For purposes of administration the country is divided into twelve districts, in each of which is established a Federal land bank. To deal with the borrowers, the latter are required to organize themselves farm loan associations, composed of at least ten members each. These local organizations make themselves responsible for the integrity of each borrower, somewhat on the principle of the credit union system. To each bank, however, is attached a staff of appraisers, who are responsible for the valuation fixed for the property of each borrower. Loans are granted only on condition that they will be used for improvements on the property mortgaged, the sums lent ranging from $100 to $10,000, for terms ranging from 5 to 40 years. The borrower may borrow only on property which he is cultivating himself. The banks are located at Springfield, Mass.; Baltimore, Md.; Columbia, S.C.; Louisville, Ky.; New Orleans, La.; St. Louis, Mo.; St. Paul, Minn.; Omaha, Neb.; Wichita, Kans.; Houston, Tex.; Berkeley, Cal.; and Spokane, Wash.

FARM MANAGEMENT, the economic conduct of an agricultural enterprise on principles similar to those on which any industrial enterprise is conducted. Agriculture may be said to be the one big industry which has not yet emerged from the one-man, handicrafts period of industry in general. In great proportion farming is still the enterprise of the single man, whereas manufacturing has become adapted to the corporation form of ownership. This is largely due to the fact that agriculture is not so easily subjected to the operations of machinery. Nevertheless, an agricultural enterprise, comprising even more varied operations than a manufacturing business, lends itself readily to scientific management. Under the name of 'farm management,' therefore, agricultural colleges, and state departments of agriculture, are constantly striving to educate the farmers of the country to carry on their enterprises on more scientific and economic principles. Under this heading may be included such items as the rotation of crops, the study of fertilizers in relation to special soils, the utmost use of new inventions and labor saving devices, balanced rations for stock and poultry, the proper selection of seed, the treatment of diseased animals and plants and trees, and countless other similar points involving profit and loss. In this regard it may be said that a fundamental knowledge of farm management involves a far more profound knowledge of the natural sciences than factory management requires in the field of physics or chemistry. The subject also extends beyond the main field of production, into that of buying and selling, marketing being in fact a phase of general farm management. Here the problems of the farmer approach those of the manufacturer.

FARMER-LABOR PARTY, an American political party, organized in July, 1920, to represent the interests of industrial workers and farmers. It developed from the National Labor Party, organized the year before out of various unattached units in Connecticut, New York, Pennsylvania, Indiana, Illinois and several other states. One of the peculiar features of the Farmer-Labor Party is the provision in its constitution for the direct affiliation of local, state and national farmers' organizations, labor unions and co-operative societies. Like the Socialist Party, it is financed by a dues-paying membership. The membership is estimated at around 40,000. It publishes an official, national party organ, The New Majority, issued from Chicago. In the fall elections of 1920 it gained second place in Washington, South Dakota and Minnesota. The total vote cast then was 265,411, the presidential candidate of the party being P. P. Christensen, of Utah. In the congressional elections of 1922 an alliance was formed with the Socialist Party, whereby fusion candidates were run. A significant feature of these elections was the defeat in Minnesota of Volstead, the father of the prohibition law, by the Farmer-Labor candidate, Kvale, the vote being 42,832 for Kvale, and 28,918 for Volstead. Two of the party's candidates were elected from Minnesota. The platform of the party is almost wholly copied from that of the British Labor Party, the latter serving as the inspiration for its organization. It demands an increasing degree of socialization of the industries, differing from the Socialist Party in that it does not recognize the theories of the Marxian philosophy.

FARMERS' ALLIANCE, an organization of farmers which at one time was prominent in American politics. It had its origin in Texas where, in 1876, a defensive league of ranchers was formed to protect themselves against the raids of border horse thieves. Later it took on a broader scope, including in its program the social development of farmers' families and their economic betterment. In 1887 there were local branches of the Alliance all over the country. In 1889 it combined with the labor organization, the Knights of Labor, to form the National Farmers' Alliance and Industrial Union, which proposed social and industrial reforms through economic means, largely co-operative stores. Within this organization was formed the political party known as the Populists, or People's Party, with a platform which demanded the free coinage of silver, the government ownership of transportation and other measures tending toward state socialism. This move tended to weaken the original Alliance, since the members in the South were too strongly in sympathy with the Democratic Party to be drawn into a new political organization. In 1892 The Populists polled over a million votes, largely in the West. Shortly after, the Farmers' Alliance formally withdrew from its affiliations with the People's Party, since then being purely a social organization.

FARMERS-GENERAL, Fr. association which farmed public taxes; system led to much abuse, and was abolished by Revolutionaries, 1789.

FARMERS' INSTITUTE, local organizations of farmers which had their origin in the gatherings held at the county fairs where the farmers discussed their joint problems and enjoyed social intercourse. With the development in scope of the state agricultural departments, these organizations were strongly encouraged and employed as a nucleus for co-operation with the farmers in educational and agricultural experimental work. The purpose of the institute, however, is not entirely limited to improving technical methods in agriculture, but to encourage social intercourse and to develop the home life of the farmer, especially in encouraging the farmers' children to remain at home by developing recreational facilities. Meetings of local institutes are held at varying periods, some gathering every month, while others hold bi-annual or annual meetings. In 1922 over 10,000 farmers' institutes held meetings in the United States, having a total attendance of 2,300,000. In 19 states these gatherings were held under the auspices of the agricultural colleges, and in 15 states by the state departments of agriculture. These meetings were addressed by over 1400 lecturers on topics ranging from the use of fertilizers to the furnishing of the home.

FARMING. See AGRICULTURE.

FARMS, MODEL. See AGRICULTURAL EDUCATION.

FARNBOROUGH (51° 18′ N., 0° 45′ W.), town, Hampshire, England. St. Michael's church contains tombs of Napoleon III. and Prince Imperial. Pop. 14,000.

FARNE ISLANDS, FEARNE (55° 38′ N., 1° 37′ W.), group of islets off N.E. coast of Northumberland, England.

FARNESE, Ital. family, who governed Parma 200 years. Alexander F. became Pope Paul III. in 1534; gave large properties to his natural children, of whom best known is Pierluigi, afterwards Duke of Parma, whose *s.*, Ottavio, was father of famous general, Alexander F. Line became extinct, 1731. Farnese Palace in Rome is a beautiful Renaissance building.

FARNESE, ALEXANDER (1545-92), Duke of Parma; brilliant soldier and statesman; succ. Don John of Austria as gov. of Netherlands, 1578; reduced southern provinces, which became Span. Netherlands.

FARNESE, ELIZABETH (1692-1766), queen of Spain; wife of Philip V.; noted administrator.

FARNHAM (51° 13′ N., 0° 48′ W.), market town, on Wey, Surrey, England; has ancient castle, residence of Bp. of Winchester; hop plantations. Pop. 7500.

FARNHAM, HENRY WALCOTT (1857), American economist; *b.* New Haven, Conn. He graduated at Yale in 1874 and later studied in German universities. In 1878 he became tutor at Yale and two years later was made professor of political economy in that institution, a position he held until 1918, when he became professor emeritus. From 1881 to 1903 he taught political economy also at the Sheffield Scientific school. He has served as editor of the Yale Review, the Economic Review and has been chairman and officer of many civic organizations. During the World War he was a member of the Connecticut State Council of Defense and of the New Haven War Bureau. His publications include *Die Amerikanischen Gewerkvereine*, 1879; *Memoir of Henry Farnam*, 1899; *Yale Readings in Insurance*, 1909; and *The Economic Utilization of History*, 1913; besides many contributions to periodicals on economic subjects.

FARNSWORTH, CHARLES STEWART (1862), American army officer; *b.* Lycoming co., Pa. He graduated from the United States Military Academy in 1887 and later took honors at the Army School of the Line and Staff College at Fort Leavenworth, Kas., and at the Army War College, Washington, D. C. (1916). He entered army service as a second lieutenant in 1887 and rose through the various grades, becoming Major-general in April 1918. He saw service in the Spanish-American war and also in the Philippines and on the Mexican border. In the World War he won distinction by notable service at Ypres, Lys and in the Argonne-Meuse campaign. Since 1919 he has been detailed to the Infantry School at Camp Benning, Ga.

FARNWORTH (53° 33′ N., 2° 24′ W.), town, Lancashire, England; cotton-mills; collieries. Pop. 28,000.

FARO (37° N., 7° 52′ W.), town, Algarve, Portugal; fruit, cork, fish. Pop. 12,000.

FARQUHAR, ARTHUR B. (1838), manufacturer; *b.* in Maryland. Doctor of Laws of Kenyon College in 1902. In 1856 moved to Pennsylvania to learn machinists trade. In 1858 became partner and 1862 bought firm's interest. Has large property interests and was proprietor of the *York Gazette* for some years. President of York Oratorio Society and York Hospital, York Municipal League. In 1897 was delegate from Pennsylvania to coast Defense Delegation at Florida, appointed by Governor Hastings. Was vice president and director of Chamber of Commerce of United States. In 1917 was appointed by the governor a member of Pennsylvania Defense Organizations.

FARQUHAR, GEORGE (1678-1707), Eng. dramatist; was for some time an actor; first play was *Love and a Bottle*, 1698; followed by *The Constant Couple*, *Sir Harry Wildair*, *The Inconstant*, *The Recruiting Officer*, and *The Beaux' Stratagem*, his most successful play.

FARRAGUT, DAVID GLASGOW (1801-70), American naval officer; *b.* Campbell's Station, Tenn. He was made a midshipman before he was ten years old and in 1811 went on the Essex in her memorable cruise to the Pacific. Officers were so scarce that when barely twelve Farragut was made prize master of a captured whaler and brought her safely into port. He served in 1823 against the Cuban pirates in the West Indies and during the Mexican war was in command of the Saratoga. In the Civil War he was given command of the Western Gulf blockading squadron and won national fame by the capture of New Orleans on April 28, 1862. In July of that year he became the first rear admiral in the United States service. His most notable exploit was the great victory of Mobile Bay in August, 1864, when, lashed to the rigging of his flagship, he gave the famous order: 'Damn the torpedoes; go ahead' and led the way to a glorious triumph. Following the war he made an extended cruise abroad and was awarded honors such as had been tendered to no other American naval commander.

FARRAND, LIVINGSTON (1867), American educator; *b.* Newark, N. J. He graduated at Princeton in 1888 and at the College of Physicians and Surgeons of Columbia University in 1891. He pursued post-graduate studies abroad at Cambridge and Berlin, and in 1893 joined the teaching staff of Columbia University, acting successively as instructor in psychology (1893-1901), adjunct professor of psychology (1901-03), and professor of anthropology (1903-14). In the latter year he was called to the presidency of the University of Colorado, holding that post until 1919. During the World War he was director in France of the International Health Board (1917-18). He was chairman of the Central Committee of the American Red Cross (1919-21). He became president of Cornell University in 1921. Besides many contributions to magazines he has written *Basis of American History*, 1904.

FARRAND, MAX (1869), American educator; *b.* Newark, N. J. He graduated at Princeton in 1892 and later pursued post-graduate studies at Princeton, Leipzig and Heidelberg. He was connected with Wesleyan University from 1896 to 1901 as instructor, associate professor and professor of history successively, and for the seven years following was professor and head of the department of history at Leland Stanford Jr. University, California. He taught history for two years at Cornell

(1905-06), and was made professor of history at Yale in 1898. In 1921 he was adviser in the Educational Commonwealth Fund. Besides many contributions to periodicals, he has written *Records of Federal Convention of 1787*, 1911; *The Framing of the Constitution*, 1913; *Development of United States*, 1918; and *Fathers of the Constitution*, 1921.

FARRAR, FREDERICK WILLIAM (1831-1903), Eng. cleric; headmaster of Marlborough, 1871; rector of St. Margaret's, 1876; dean of Canterbury, 1895; wrote religious works and school stories.

FARRAR, GERALDINE (1882), American Grand Opera Singer. *Born* at Melrose, Massachusetts. Educated at Melrose public schools. At Berlin and Paris received her musical education. As Marguerite in *Faust* made her professional debut at Royal Opera House, Berlin in 1901. From 1906 to 1922 member Metropolitan Opera House, New York.

FARRELL, JAMES A(UGUSTINE) (1863), *b.* in Connecticut. President of the United States Steel Corporation. Educated at New Haven public schools. At 16 began work in New Haven at steel wire mills. In 1888 laborer in mills of Pittsburg Wire Company, and later was superintendent and manager. Was general superintendent Oliver Steel Wire Company, and general manager Oliver Iron and Steel Company. President of The United States Steel Corporation since January 1911. Director of Federal Steel Company, Tennessee Coal, Iron and Railroad Company, United States Steel Products Company. Chairman National Foreign Trade Council.

FARREN, ELIZABETH (*c.* 1759-1829), Eng. actress; m. 12th Earl of Derby (1797).

FARRIER, shoer of horses, or veterinary surgeon.

FARRINGTON, OLIVER CUMMINGS (1864), American geologist. *b.* in Brewer, Maine. In 1881 at University of Maine, Bachelor of Science and 1891 Doctor of Philosophy at Yale College. From 1882-1887 instructor of science in Maine Academy. From 1894-1904 was lecturer of mineralogy at University of Chicago. At St. Louis Exposition in 1904 was member of Jury of Awards. Author of *Gems and Gem Minerals*, 1903; and *Meteorites*, 1915. From 1915-1916 was President American Association of Museums. Contributes to scientific journals.

FARS (30° N., 52° E.), province, on Persian Gulf, Persia; capital, Shiraz; Bushire is principal port; area, *c.* 53,500 sq. miles; interior is mountainous, with long fertile valleys; many salt lakes.

FARTHING, smallest Eng. copper coin; originally of silver; copper f's date from Stewart times.

FARTHINGALE, female hooped petticoat, first worn in England in Elizabeth's reign.

FARUKHABAD, FARRUKHABAD, (27° 23′ N., 79° 37′ N.), city and district, Agra division, United Provinces, India. City is joint municipality with Fategarh; Mahrattas defeated here by Lak., 1804; held by native troops, 1857-58. Pop. 67,338. District forms part of Doab; capital, Fategarh; chief crop, rice. Area, 1685 sq. miles. Pop. 930,000.

FASANO (40° 59′ N., 17° 20′ E.), town, Bari, Italy; olive oil.

FASCES, bundles of birch or elm rods, from which an axe-head projected, carried by *lictors* before Roman magistrates.

FASCIA, in arch., a flat band, portion of the architrave.

FASCINATION, term applied in botany to peculiar growth, which sometimes appears in plants, characterized by flattening of growing point and consequent irregularity of structure.

FASCINE, long cylindrical bundle of sticks, closely bound together, used in fortification and military engineering.

FASCISTI, name applied to an organization embracing the more conservative elements in Italy, which in 1922 took possession of the Italian Government.

The Fascisti movement was organized to combat the excesses of Communism. The name is derived from an Italian word, fascio, which means a bundle of sticks. It drew its origin from the old Roman lictors, the body-guard of the ancient Roman Consuls who carried an axe with a handle surrounded by a bundle of sticks (fasces).

In the period immediately following the war, Italy was dominated and terrorized by the communist element and the Kingdom seemed to be headed straight toward Bolshevism. The communists constituted only a slender minority of the people but for two whole years they were absolute and unchallenged masters of Italy. In certain cities they took complete possession of the government, levying taxes, dispossessing landlords, performing marriages, granting divorces, passing their own laws and enforcing them with their own police. Army officers were assaulted and spat upon. The kingdom was in a state of chaos and the Government, palsied and vacillating, dared not attempt coercive measures.

These intolerable conditions at last provoked reaction. The more stable, patriotic and conservative elements of the kingdom formed an organization to curb communist outrages and restore law and order. At the head of the movement, which adopted the name Fascisti, stood Benito Mussolini, one of the most remarkable figures of the century. Prior to the war he himself had been a socialist, in bitter revolt against the Government. When Italy joined the Entente however, he changed his attitude, serving in the ranks and being many times wounded.

In 1919, incensed by prevailing conditions, Mussolini gathered about him a band of ardent spirits, many of them ex-soldiers, and engaged in a species of guerrilla warfare with the subversive elements. Bands of the Fascisti swept down upon certain cities under communist control and ousted their opponents. Many sanguinary combats took place but as the real weakness of the communists was exposed the ranks of the Fascisti swelled with magical rapidity. At the Naples Congress in 1922 the organization comprised 600,000 members in the political group not under military discipline, 800,000 drawn from trades unions and 350,000 active combatants organized on the model of the legions of old Rome and rigidly drilled and disciplined.

By this time the communists were thoroughly cowed and beaten. The Government itself which was declared to be weak and incapable both in its foreign and domestic policy and too subservient to socialist demands remained to be reckoned with. Mussolini in the name of the Fascisti demanded that the Government be handed over to his organization. There were no half measures. On October 26 he declared openly:

'I take a solemn oath that either the Government or the country must be given peacefully to the Fascisti, or we will take it by force.'

Immediately after this pronunciamento, Mussolini marched on Rome with 100,000 followers. The Government at first, in panic, proposed to invoke martial law, but the march of the Fascisti was accompanied by such acclamations on the part of the people that the Government capitulated. The King met and embraced Mussolini on the latter's entrance into Rome and authorized him to form a cabinet of his own choosing. The revolution, which reached this dramatic climax October 30, 1922, was bloodless and complete. Mussolini formed a cabinet, largely from the membership of the Fascisti, and himself retained the portfolios of the Interior and of Foreign Affairs, thus giving him complete control of the nation's domestic and foreign policy. Immediately after the formation of the cabinet, Mussolini appeared before the Italian parliament and demanded rather than requested a vote of confidence. It was given to him by an overwhelming majority. The essential features of his program were work, economy and efficiency, and in pursuance of these aims, drastic and far-reaching changes were introduced and developed. The monarchical form of government was maintained, but actual power had passed from king and parliament to the Fascisti organization and the extraordinary man who stood as its head and representative.

The Fascisti emblem in Italy is the black shirt, usually of silk, and a stout cane which is commonly the only weapon, although members of the military branch carry revolvers. Khaki trousers complete the costume. The success of the Fascisti movement in Italy has spread uneasiness among several of the chancelleries of Europe, and similar organizations have sprung up in many countries. The Fascisti in Bavaria, Germany, are said to number 60,000. The movement has taken root also in Austria, Hungary, Czechoslovakia and Jugoslavia, and there are small Fascisti organizations in England and the United States.

FASHION. See Costume.

FASHODA (9° 55′ N., 32° 10′ E.), town, on White Nile, Egyptian Sudan; occupied by Fr. July 1898; surrendered to Kitchener, Nov. 1898; modern Kodok.

FASTI, in ancient Rome, days on which it was permissible to transact business (as opposed to *nefasti*); lists of these days being published in Forum, word came to mean 'calendar,' which included sacred and historical Fasti.

FASTING.—Fasting from religious motive is found in practically all religions, and is often regarded as the invariable and inseparable accompaniment of piety. It has been suggested that it originated as a preparation for the eating of sacrificial food; or it may have been considered as in itself an act of worship, or as a means of subjecting the physical to the spiritual faculties. F. at stated times was practiced by Hindus, Parsees, Greeks, Romans; in Egypt there seem to have been no obligatory general fasts, but those about to be initiated into the religious mysteries of Isis and Osiris were obliged to practice rigorous abstinence beforehand. Among the Jews f. was important, nd on the 10th day of the 7th month vas compulsory for whole nation, disobedience being punishable by death. Other compulsory fasts were afterwards rdained to commemorate certain naional disasters, and seem to have been enerally observed.

In the time of our Lord a great numer of fasts were held; and although Christ Himself neither required nor orbade His disciples to fast, the Church as ordained many f. seasons for its nembers. Church of England does not nsist on the observance (though the Book of Common Prayer includes a Table of the Vigils, Fasts, and Days f Abstinence to be observed in the ear'), and in Scotland it is practically nknown among members of Presbyerian churches. The Gk. Church has great number of fasts, which are rictly observed; and the R.C. Church as, besides the vigils of certain Feasts, e great fast in Lent, weekly abstinence om meat on Fridays, and four annual sts, called the Quatembers, of three ays in one week each. Among Mohamedans f. is compulsory in the month Ramadan.

FASTOLF, SIR JOHN (*d.* 1459), Eng. ldier, distinguished in Fr. wars; gov. Bastile, 1420; regent of France, 1422; on victory at Rouvray, 1429; in some spects original of Shakespeare's Falaff.

FAT, natural oils in plants and anials; most important are olein, stearin, lmitin.

FATA MORGANA, phenomenon seen Strait of Messina; similar to mirage.

FATALISM, doctrine of inevitable edetermination.

FATEHGARH, cantonment, 3 miles of Farukhabad; has Government gunrriage factory; European population assacred, 1857. Pop. *c.* 13,000.

FATEHPUR (25° 55′ N., 80° 53′ E.), wn and district, Allahabad, United ovinces, India. Town contains two e mosques; agricultural trade. Pop. 281. District forms part of Doab. ea, 1,618 sq. miles. Pop. 69,000.

FATEHPUR SIKRI (27° 5′ N., 77° E.), town, Agra district, United ovinces, India; former capital of ogul Empire, founded by Akbar, 69; remains of magnificent mosque d other ruins.

FATES, in classical mythology were resented by three women: Clotho, o spun the thread of life; Lachesis, o assigned to man his lot in life; ropos, who cut the thread.

FATHER, male parent; one who begets, also one who originates; name applied to God, to the Pope, to priests of R.C. Church; to the Early Christian writers, known as 'the apostolic fathers,' who were contemporary with, or immediately followed, the apostles; senior member of a society, parliamentary body etc. The term, 'f. of comedy,' has been applied to Aristophanes; 'f. of tragedy,' to Æschylys; 'f. of Eng. poetry,' to Chaucer; 'f. of Eng. prose,' to Roger Ascham.

FATHERS OF THE CHURCH, Early Christian teachers and writers renowned for saintliness and orthodoxy. The *patristic* period is by some writers continued to XIII. cent. in Latin Church, and to Council of Florence (1441) in Gk. Church, but is more generally considered to mean period from time of Apostolic Fathers (II. cent.) till rise of schoolmen in Middle Ages, ending for Gk. Church with John of Damascus (*c.* 756) and for Latin Church with Gregory the Great (*d.* 604); it is usually subdivided into periods before and after Council of Nicæa, 325 A.D. *Ante-Nicene* fathers include: Greek—Justin Martyr, Irenæus, Athenagoras, Clement of Alexandria, Hippolytus; Latin—Tertullian Minutius Felix, Cyprian. *Post-Nicene* fathers include: Greek—Eusebius, Athanasius, Basil, Cyril of Jerusalem, Gregory, Nazianzen, John Chrysostom, Cyril of Alexandria, John of Damascus; Latin—Ambrose, Jerome, Augustine, Gregory the Great.

FATHOM, nautical measure (6 ft.) of depth.

FATIGUE, (1) In physiology, 'Muscular F.' is the diminishing of the contractions brought about by stimuli. The muscle is a machine for utilizing the energy contained in its own chemical compounds; if the excitations of the muscles are continued beyond a certain point the muscle cells are poisoned by the excreta of their own waste chemical products. The muscle recovers if allowed to rest unstimulated for a time, or, more quickly, if washed with an innocuous but unnutritious solution such as 6 per cent. NaCl in water. The same waste-product of the muscles produce 'F.' in the unsheathed ends of the nerve-plates, and the central sensor and motor nerve cells exhibit the same phenomena and a general irresponsiveness to ordinary stimuli. (2) In materials, F. is the term used to denote the weakening of a metal bar by a repeated succession of the strain of loads considerably less than the breaking weight of the bar, as when a car-axle breaks from the continued strains and blows which it experiences, or a member of machinery, such as a piston-rod, which is constantly in alternate tension or compression. F. of metals is due to a molecular change in the metal due to vibration or the constant application of a varying strain.

FATIMITES, FATIMIDES, dynasty descended from Ali and Fatima, *dau.* of prophet Mohammed, of which chief members were: Al-Mahdi-'Obaidallah (909-33), caliph of Tunis; conquered N. Africa. Al-Qā'im Muhammad (933-45) gained Sicily. Moizz Abū Tanim Ma'add (969-75) conquered Egypt; founded Cairo. Aziz Abū Mansūr Nizār (975-96) extended N. African possessions. Hakim (996-1020) persecuted Christians; gave impetus to Crusades. Zahir(1020-35) lost and regained Syra. Mostansir (1035-94) lost Cairo to Turks; afterwards recovered. Mosta'li (1094-1101); possessions in Palestine lost to Franks. Amir (1101-30) lost Tyre to Franks; assassinated. Zāfir (1149-54) lost Ascalon; murdered. 'Adid (1160-71), last F. caliph, deposed and died, 1171, when new dynasty was founded by vizier Saladin.

FATTY COMPOUNDS, one of the two great divisions into which the substances studied in organic chemistry are divided. The word 'fatty' was originally applied to the acids derived from the paraffins, but is now extended to denote all compounds regarded as derivatives of methane.

FAUBOURG, Fr. equivalent for suburb; applied to various parts of Paris absorbed by that city.

FAUCES, the passage between the mouth and the pharynx, the soft palate being above and the root of the tongue below, while at the sides are the pillars of the f., with the tonsils between them.

FAUCHER, LÉONARD JOSEPH (1803-54), Fr. journalist and politician; minister of public works under Louis Napoleon; subsequently minister for interior; wrote on economics.

FAUCHET, CLAUDE (1744-93), Fr. ecclesiastic, at court of Louis XVI., but sympathized with Revolution; protested against king's execution, and himself guillotined.

FAUCIT, HELENA SAVILLE (1817-98), Eng. actress and author; famous for Shakespearean impersonations; m. Sir Theodore Martin; wrote *Shakespeare's Heroines*, etc.

FAUJAS DE SAINT-FOND, BARTHÉLEMY (1741-1819), Fr. geologist; took up study of law, but abandoned profession; investigated rocks of the Alps; as assistant commissioner of mine traveled through Europe studying nature of rocks.

FAULT, geological term denoting fracture in the strata which has also displacement of deposits on either sid of the fracture. F's, which are found i rocks of all kinds and ages, may be of simple or compound nature (*i.e.*), ther may be the one single f., or the singl original f. may be accompanied by mino f's branching off the main one lik branches of a tree. The cause of f's i at present unknown, although ther have been many suggestions. A sudde yield of strata along a f. line cause an earthquake, with which phenomen f's are therefore directly connected Numerous f. lines are shown on geologica maps.

FAUNA, animals of any region.

FAUNCE, WILLIAM HERBERT PERRY (1859), American clergyma and educator; *b.* Worcester, Mass. H graduated at Brown University in 1880 and at the Newton (Mass.) Theologica Seminary in 1884. He entered th Baptist ministry and held pastorate at Springfield, Mass. (1884-89), and i New York City (1889-99). In the latte year he was chosen president of Brow University. His publications include *What Does Christianity Mean?* 1912 *Social Aspects of Foreign Missions*, 1914, *Religion and War*, 1918.

FAUNUS (classical myth.), the Rom god of agriculture and of shepherds later identified with the Gk. Pan (*q.v.*)

FAURE, FRANÇOIS FÉLIX (1841-99), *b.* in Paris, *s.* of a furniture maker; became a tanner and merchant at Havre, where he was very successful financially; was elected member of the National Assembly in 1881, and took a keen interest in economics and politics. Appointed Under-Secretary for the Colonies in M. Férrier's ministry in 1888; vice-president of the Chamber in 1893; appointed president of the Republic in 1895 upon resignation of Casimir-Périer. It was through his diplomacy and tact that the Franco-Russian alliance was accomplished in 1897. Died of apoplexy.

FAURE, GABRIEL URBAIN (1845-) Fr. composer; a pupil of Niedermeyer and also of Saint-Saëns, he was successively organist at St. Sulpice, St. Honoré, and the Madeleine in Paris. In 1892 he was appointed inspecteur des beaux arts, in 1896 prof. of harmony at the Conservatoire, and in 1920 director of that institution. As a composer he is noted for his songs. He has also written some orchestral works, music to a number of plays, the cantata *The Birth of Venus*, etc.

FAURE, JEAN BAPTISTE (1830-1914), Fr. baritone singer; was for years one of the greatest of operatic baritones; appeared in the chief capitals of Europe.

FAURIEL, CLAUDE CHARLES (1772-1844), Fr. littérateur; private sec. to Fouché, 1799; resigned post to devote himself to letters; principal work: *Histoire de la Gaule Meridionale sous la Domination des Conquerants Germains.*

FAUST, FAUSTUS, a character around whom much legend has crystallized. Dr. John Faustus is said to have been *b.* at Knittlingen, in Würtemberg, and to have *d.* about 1540. By most accounts he was a wandering necromancer, who lived by his wits, and there are a number of references to him by contemporaries. The earliest pub. account of the F. story was that of Johann Spies, issued at Frankfurt, in 1587. The story runs that F., the learned doctor, sold his soul to the devil (Mephistopheles), who restored his lost youth and permitted him to enjoy all kinds of wordly pleasures for twenty-four years, and at the end of which time he was carried to Hell. An Eng. version appeared some time after 1588, and upon this Christopher Marlowe founded his great tragedy (first played in 1594; pub. 1604). Goethe's masterpiece, conceived upon somewhat more ambitious lines, was pub., pt. i., 1808; pt. ii., 1831. Musical works on F. story have been composed by Gounod, Berlioz, and Boito.

FAUSTINA (*d.* 141), wife of Emperor Antoninus Pius. Her *dau.*, Faustina (*d.* 175 A.D.), was wife of Emperor Marcus Aurelius, who was devoted to her.

FAVARA (37° 15′ N., 13° 37′ E.), town, Girgenti, Sicily; sulphur mines. Pop. 21,000.

FAVART, CHARLES SIMON (1710-92), Fr. dramatist; wrote vaudevilles and comic operas. *Le Coq du village, Annette* et *Lubin. Les Trois Sultancs,* and *Ninette a la Coeur.*

FAVERSHAM (51° 19′ N., 0° 52′ E.), market town, river port, Kent, England; remains of abbey founded by King Stephen; important oyster fisheries; gun-powder mills. Pop. 1921, 10,870.

FAVERSHAM, WILLIAM (1868), American actor; *b.* England. He studied at Hilmartin College, London, served in the English yeomanry corps and in 1887 made his first appearance on the stage. The following year he came to America, where for two years he played in the cast of Mrs. Fiske, joining the Empire Theatre Company in 1893 and becoming leading man of that organization in 1906. He left the company in 1901, starred in *A Royal Rival*, and in 1908 and subsequently appeared under his own management. Some of his marked successes were achieved in *The World and His Wife, Herod, The Squaw Man*, 1906; *Julius Caesar*, 1912; *Othello*, 1914; and *The Silver Fox*, 1922, in which year he also revived *The Squaw Man*, with Mrs. Philip Lydig, the society leader, in his cast.

FAVRAS, THOMAS DE MAHY, MARQUIS DE (1744-90), Fr. soldier; on Royalist side at Revolution; tried to aid Louis XVI.; arrested, 1789; hanged, 1790.

FAVRE, JULES CLAUDE GABRIEL (1809-80), Fr. politician; actively participated in revolutions of 1830 and 1848; leader of Republican party, 1863; Foreign Minister on dissolution of Empire, but resigned.

FAVUS, skin disease, occurring on the scalp and sometimes on other parts of the body, forming yellow, irregular, cup-shaped crusts.

FAWCETT, EDGAR (1847-1904), an American writer, was born in New York. He devoted himself chiefly to the writing of novels, but he also wrote poems, plays, and a volume of essays. His novels give some very good pictures of New York society. Some of them are: *A Romance of Old New York, An Heir to Millions, Purple and Fine Linen, Voices and Visions.* Some of his poems are contained in *Short Poems for Short People*, 1871; and *Songs of Doubt and Dream*, 1889.

FAWCETT, HENRY (1833-84), Eng. political economist; *b.* Salisbury; ed. King's Coll. School, London, and Cambridge; lost eyesight, 1858; prof. of Political Economy, Cambridge, 1863; M.P. for Brighton, 1865; Postmaster-General in Gladstone's administration, 1880; initiated parcels post, sixpenny telegrams, savings bank, and postal orders.

FAWCETT, M. EDWARD (1865), American clergyman; *b.* New Hartford, Iowa. He graduated at the Upper Iowa University in 1886 and later studied at the Garrett Biblical Institute, Evanston, Ill. In 1897 he was ordained to the ministry of the Protestant Episcopal Church; held rectorates in Elgin, Ill., 1897-1901, and Chicago, 1901-04, and was consecrated bishop in 1904. In 1917 he was chaplain of the 33rd Division. He took an active part in secular as well as religious affairs, and in 1919 was president of the Quincy Chamber of Commerce.

FAWCETT, MILLICENT GARRETT, (1847), Eng. author, widow of the Rt. Hon. Henry Fawcett, postmaster-general; she is best known for her work in connection with the education of women and women's suffrage movement; has pub. *Political Economy for Beginners, Janet Doncaster* (a novel), *Life of Queen Victoria, Five Famous Frenchwomen,* etc.

FAWKES, GUY (1570-1606), Eng. conspirator; became zealous Catholic, acting as agent of Span. party in England; fought for Spain in Netherlands; returned to England at Catesby's invitation to assist in Gunpowder Plot, 1604; arrested in cellar beneath Parliament House, Nov. 4, 1605; tortured until revealed conspirators' names; and hanged.

FAYAL (38° 23′ N., 28° 48′ W.), one of Azores Islands; chief town, Horta; exports fruit. Pop. 22,000.

FAYETTEVILLE, a city of Arkansas, in Washington co., of which it is the county seat. It is on the St. Louis and San Francisco, and the Kansas City and Memphis railroads. It is the site of the Ozark Mountains, surrounded by unusually attractive scenery which makes it a popular summer resort. It is the center of the fruit growing region of northwestern Arkansas. Here is the Arkansas Industrial University. The industries of the city include a foundry, flour mills, wagon factory, and fruit evaporating establishments. Pop. 1920, 5,362.

FAYETTEVILLE, a city of North Carolina, in Cumberland co., of which it is the county seat. It is on the Atlantic Coast Line Railroad, and on Cape Fear River. Its industries include the manufactures of tools, carriages, woodenware, turpentine, cotton, etc. Its public institutions include a high school, military academy and State Colored Normal School. Here, on April 22, 1861, Confederates seized the United States arsenal. General Sherman occupied the city on March 11 to 14, 1865, and destroyed the arsenal. Pop. 1920, 8,877.

FAYOLLE, MARIE EMILE (1852), Fr. soldier; was promoted general in 1910, and at outbreak of World War (1914) was commander of 70th Division of Infantry; he was placed in command of the 33rd Army Corps in 1915, and in 1916 of the 6th Army; in 1917 was commander of Fr. army in Italy.

FAYRER, SIR JOSEPH, Bart. (1824-1907), Eng. physician; surgeon in Lucknow Residency during the Mutiny (1857); prof. of Surgery in Calcutta Medical Coll. (1859); pres. of the India Office Medical Board (1874); author of works on Ind. medical subjects.

FAYUM (29° 22′ N., 30° 55′ E.), province, Upper Egypt; area, *c.* 500 sq. miles; well watered and fertile, a portion in N. being occupied by Lake Kirket-el-Kerun (ancient Mœris); inhabitants chiefly agriculturists; principal products, fruit, cereals, rice, cotton. Pop. 507,617. Chief town, Fayum. Pop. 44,000.

FAZOGLI, FAZOKL (11° 15′ N., 34° 50′ E.), district, Anglo-Egyptian Sudan, on both banks of Blue Nile; exports gold, tobacco. Pop. *c.* 500,000.

FEASTS, FESTIVALS, are occasions periodically set apart for mourning or rejoicing, or in celebration of some deity, saint, hero, or special event. Such f's are common to all peoples and all countries. The ancient Egyptians had their f's of the Dead, and others in honor of Isis, Osiris, etc. The Greeks followed with their two yearly f's—the harvest and the vintage—but these were soon increased by the addition of f's in celebration of innumerable deities, out of which arose the Olympic, Nemean, Pythian, and Isthmian games. The Romans, imitating the Greeks, had their Lupercalia, in honor of Pan; Saturnalia, in honor of Saturn, and numerous other f's.

The Hindus observe many f's, among the more important being Pongal, Holi, Dasahara, and Dipavali; these had their origin in the changes of the seasons, but became identified with certain gods and goddesses. Of the Muhammadan f's may be mentioned Muharram, commemorating the martyrdoms of Ali and his sons, Hasan and Husain; and Ramazan, sacred as the month in which Muhammad returned from his meditation. Amongst the Jewish celebrations may be mentioned the Passover and the F. of Tabernacles. Christian peoples honor Christmas, or the Nativity, Easter, Whitsuntide, Trinity Sunday, besides numerous days devoted to the memory of saints and martyrs.

FEATHER GRASS (*Stipa pennata*), Brit. garden plant having feathery awns; Esparto is of the genus.

FEATHERS. Feathers are elaborate structures possessed only by one group of animals, namely, birds, and each is derived primarily from a small, hollow, epidermal *papilla*, whose center is occupied by a core of more internal tissue. The epidermis produces the f. itself, whilst the pulp. which nourishes the developing f., and remains as a shrunken mass in the mature quill, is derived from the central portion. A mature f., like the large f's from the wing of a goose, consists of two main parts, the quill or *rachis*, and the closely packed lateral branches or *barbs*. The quill is grooved on the under surface, and contains two apertures, one basal, through which the f. derived nourishment when immature, the other situated on the under surface in the neighborhood of the lowest barbs. Each barb produces smaller barbs or *barbules* on either side, and these again terminate in minute hooks or *barbicels*. Apart from the lowest barbs, which are imperfect, the barbules, by means of their hooklet systems, produce a strong and elastic structure, impervious to air, and capable owing to its concave undersurface of resisting great pressure from below. Most f's bear, near the base, a small additional structure termed the *after-shaft*. Where the system of hooklets is imperfect, a softer, more downlike f. is produced, as in the ostrich, the *down* which covers the duckling and chicken, and also constitutes an important part of the mature plumage of many birds, being somewhat similar in character, though it may consist merely of a small apical tuft of fluffy matter. Minute hair-like structures, termed *filoplumes*, are often found surrounding the bases of the larger f's, as in the goose, and these either branch very little, or not at all. The f's of the heron are peculiar n that they shed a dry, greasy substance ermed *powder-down*. F's are believed o have evolved from the reptilian cale, and are essentially similar in development.

FEATHERSTONE (53° 42′ N., 1° 20′ W.), town, W. Riding, Yorkshire, England; coal mines. Pop. 15,000.

FEATHER RIVER, in California, ributary of the Sacramento, which it oins about 18 m. above the city of Sacramento. It has a length of 250 m., nd is navigable for steamers to Marysville. Gold is found on its banks.

FEBRIFUGE. See Fever.

FEBRUARY (Lat. *Februarius*), 2nd nd shortest month of the modern year; ontains 28 days, and in leap years 29; mongst the Romans it was the feast of xpiation and purification, and the month in which the Lupercalia were eld. Candlemas Day (2nd) and St. Valentine's Day (14th) occur during his month.

FECAMP (49° 46′ N., 0° 22′ E.), seaport, watering-place, Seine-Inférieure, France; has XIII.-cent. Benedictine abbey church; 'Benedictine' liquor distillery; deep-sea fisheries, various manufactures. Pop. 15,400.

FECHNER, GUSTAV THEODOR (1801-87), Ger. philosopher and psychologist; based metaphysics on natural science, and proceeded by methods of induction and analogy; founded psychophysics, and discovered psycho-physical law of relation between stimulus and sensation.

FECHTER, CHARLES ALBERT (1824-79), Anglo-Fr. actor; famed in England and America for Shakespearean impersonations.

FECKENHAM, JOHN (*d.* 1585), Eng. cleric; became Abbot of Westminster, 1556; sent to Tower in 1560 for refusing to take Oath of Supremacy; most of remaining life spent in captivity.

FEDERAL COUNCIL OF THE CHURCHES OF CHRIST IN AMERICA. Established in 1908 by the action of 30 Protestant denominations to represent them, and act for them in matters of common interest. The work of the Council is carried out by several committees interdenominational in membership in various fields of church interests. The Committee on Evangelism is devoted to the evangelical work of different denominations, to secure co-operation and to organize evangelical campaigns by churches throughout the country. The Committee on Church and Social Service deals with educational and research work about church and social matters; to establish better relations with industry and to hold conferences between the church, employers and workers for co-operation, and to introduce a Christian spirit in industry. The Committee of International Justice and Good Will, aims to promote Christian internationalism, the reduction of armaments and to secure a better understanding with the East. The Committee on Council of Churches organizes and develops local federations, or church councils in large communities to help community life. The Committee of Church and Race Relations works to secure co-operation between black and white races and especially to secure rights for the negro. The Committee of Mercy and Relief deals with such calamities as the Russian famine. Other committees are Christian Education, Temperance, etc.

The President of the Federal Council is Robert E. Speer; treasurer Alfred R. Kimball; and secretaries, Charles S. Macfarland and Samuel M. Cavert.

FEDERAL FARM LOANS. See Farm Loan Acts.

FEDERAL PURCHASING BOARD. See Budget System, United States.

FEDERAL RESERVE BANK. See Bank, Federal Reserve.

FEDERALISTS, members of the Federalist Party, which developed in support of the ratification of the Federal Constitution, after the Revolutionary War. The Federalists were led by Washington, Hamilton and supported by Benjamin Franklin. Their policy was to bind the states strongly together through a centralized government, patterned after those of Europe. Their opponents, known as Anti-Federalists, stood for the principle generally known as 'states' rights,' desiring a loose confederation of locally autonomous states. The contests between these contending forces began in 1788, while the various states were still considering whether to ratify. Finally the Federalists triumphed, the Constitution being ratified. In 1800, however, they were defeated on account of their supposed pro-British sympathies, and their opponents elected Thomas Jefferson President, the ablest exponent of their principles.

FEDERATION, the union of several states under one government so that they represent one united body, particularly in regard to defense and foreign affairs, although the several states reserve certain departments of administration for their own control. An instance is the Commonwealth of Australia, in which everything not specifically reserved for the Federal Government is under jurisdiction of the several states; while in the Dominion of Canada everything is under jurisdiction of the Federal Government except what is specifically reserved for the several governments of the provinces forming the Dominion. Other examples are the United States of America, the German 'Reich,' the Swiss Republic, Argentine Republic, Brazil, Mexico, Venezuela, and Federated Malay States. Ancient federations were the Ætolian and Achæan Leagues in Greece, and the Lycian League in Roman times. A closer form of union than federation is *unification* (*e.g.*, the Union of 1707 between England and Scotland and the Union of S. Africa, 1910), which involves complete legislative union, there being only one central government and one supreme parliament, sovereignty and legislative rights being abandoned by the individual states or kingdoms which are merged in such a union. The modern tendency is to restore the merged legislative rights of the various countr
by the establishment of subordina
parliaments for local legislation and t
supervision of local administration.

FEDERATION, ARTICLES OF. S
Articles of Federation.

FEDERATION, COOPERATIVE. S
Cooperation.

**FEDERATION OF LABOR, AME
ICAN.** See American Federation
Labor.

FEDERICI, CAMILLO (1749-180
Ital. playwright; prolific writer
popular comedies.

FEE, the charges of a professio
man; the educational charges at a un
or coll.; land held in 'fee simple' (*i.*
freehold), by which the holder is t
absolute owner, and may do with it
he pleases. The opposite of this is la
which is 'entailed,' (*i.e.*), inalienab
land which descends to the heirs cf
body and their heirs.

FEEBLE-MINDED, THE CARE O
No definition of the term 'feeble-minde
can stand the test of strict analys
Various attempts at classification ha
been made, none wholly satisfacto
because of the 'twilight zone' in whi
the subject lies. In general it may
said that a feeble-minded person is o
who, due to some mental defect
birth or a later imperfect brain develo
ment, is unable to perform the duti
or live the life of the great mass of ma
kind.

For purposes of discussion the feeb
minded may be regarded as falli
within one of three groups: idio
imbeciles and morons. Using as a co
parison the development of norm
children between the ages of one a
twelve years, the idiot has the ment
development of a normal child of 1 or
years; the imbecile that of a child
from 3 to 7; the moron that of a chi
of from 8 to 12. The idiot is helple
and hopeless. The imbecile may ha
a cloudy understanding of simple thing
can obey a command, go on an erran
accomplish certain mechanical task
The moron is slow, heavy, stupid, c
learn even the simplest things wi
great difficulty, has little initiativ
requires direction and supervision.
is what is commonly spoken of as
'very backward child.' Yet he c
learn to read and write, perhaps a
and subtract, and, grown to manhoo
can engage in some routine occupati
not requiring foresight or judgment a
be a fairly useful citizen.

In modern times society has reco
nized its obligation to care for the feebl
minded. Not only is this prompted

umanity, the duty of the strong to-
ard the weak, but it is the dictate of
lf-preservation. Investigation has
own that an appallingly large number
criminals, drunkards, paupers and
ostitutes are recruited from the ranks
the mentally defective. Their weak
entality makes them easily led astray
others, and their own lower instincts,
t controlled by reason and judgment,
unge them into wrong-doing. Inves-
gation has revealed that 50 per cent
the youths in reformatories are men-
lly deficient and that the same thing
true of from 25 to 50 per cent of the
ison population. A study of 2,000
ostitutes at the New York State
formatory for Women has shown that
per cent were mentally subnormal.
view of the fact that the feeble-
nded comprise from .3 to .4 of 1 per
nt of the population, as demonstrated
studies made in America and Great
itain it can be seen what a vastly
proportionate number of these turn
crime.

The present day movement to pro-
le suitable care for the feeble-minded
tes back to 1835 in Germany and
37 in France, although some sporadic
l fruitless attempts had been made
or to that date. The first step in that
ection in the United States was taken
1848 when Dr. Samuel G. Howe
rted a class for the training of idiots
the South Boston Blind Asylum.
is movement has developed until
lay about three fourths of the States
the Union have special institutions
colonies for mental defectives.

n most of the large cities special
sses are set apart in the schools for
teaching of morons. While they
not master the usual studies they
be trained to use their hands and
certain kinds of industrial and
nual work that do not demand any
at amount of memory or judgment.
n the State institutions and colonies,
nes and calisthenics are employed
ix attention and promote coordina-
. Music has been found of great
rice. The boys and men are taught
ving, basket-making, mat-making,
mithing, gardening and carpenter-
Girls and women are trained in
sework, sewing and fancy work.
re than 35,000 feeble-minded per-
s are thus being cared for in institu-
s and colonies of 34 States.

EEHAN, DANIEL F. (1855), Roman
holic Bishop; *b.* at Athol, Massa-
setts. Educated at St. Joseph's
inary, Troy, New York and St.
y's College, Montreal, Canada.
stant at St. Bernard's Church at
hburg, Massachusetts. Was Pastor
of St. Bernard's Church, Fitchburg, Massachusetts and St. Luke's Church West Boylston, Massachusetts. In 1907 consecrated Bishop of Fall River.

FEELING. See SENSATION.

FEHMARN, FERMERN (54° 28′ N., 11° 10′ E.), island in Baltic, belonging to Prussian province of Holstein; separated from mainland by F. Sound. Pop. *c*, 10,000.

FEHMIC COURTS, mediæval Ger. courts, which became an important institution in XII. cent.

FEHRBELLIN (52° 50′ N., 12° 46′ E.), town, Brandenburg, Prussia, Germany; scene of defeat of Swedes by Frederick, Great Elector, 1675.

FEISAL, or **FEISUL, EMIR** (1883), third *s.* of Hussein, King of Hejaz; educated at Constantinople during the residence of his *f.* in that city (1890-1908), after whose accession to sherifate of Mecca he became member for Sedda in Turk. Parliament; identified himself vigorously with Arab movement. At opening of World War was sent by his *f.* to Damascus, where he lived with Djemal Pasha, but by means of ingenious devices supplied Mecca with valuable information. Early in 1916 he accompanied Djemal and Enver Pasha to Medina, where with difficulty he secured the safety of the unwelcome guests. In June the standard of revolt was raised at Mecca, and Feisal and his *bro.* unsuccessfully attacked Medina. While posted on hills to the S.W. was visited by T. E. Lawrence, who saw in the young Arab an ideal leader, and was recognized by him as a heaven-sent guide, philosopher, and friend. The partnership then entered into continued throughout the war, and was largely responsible for the series of victories which carried Arab arms to Damascus (Oct. 3, 1917). The military operations of the Arab army are described under Arabia. Feisal visited Paris and London as his *f's* representative to the Peace Conference. Early in March 1920 he was crowned by his followers King of Syria at Damascus. He was compelled by France to abandon this, but in 1921 became King of Irak or Mesopotamia, under the protection of Great Britain. See SYRIA; IRAK.

FEITH, RHIJNVIS (1753-1824), Dutch poet and novelist; wrote didactic and lyrical poems; *Ferdinand and Constantia*, and other popular novels.

FELAND, LOGAN (1869), Officer of United States Marine Corps. *b.* in Kentucky. In 1892 at Massachusetts Institute of Technology was Bachelor but on the subsequent disuse of armor the art was revived.

Scientific swordcraft would seem to have originated in Germany, where there were gilds of f. masters in the XV. cent.; in the following cent. the state of society in Italy was such that skill in single combat was essential, and in that country the rapier style was first introduced; the art was further developed by the Spaniards, whose improvements the Italians afterwards adopted. The Ital. style, with long rapiers, was greatly practiced in Elizabethan England but in the XVII. cent. a new school was founded in France, in which the long rapier was superseded by a shorter weapon. The use of this caused the disappearance of the dagger, which up to this time had been considered necessary as an additional weapon. The new style quickly came into favor, and the Ital. method fell into disrepute. Most of the f. terms used in England are derived from Fr. words. Such are the *tierce*, a position in parrying which protects the upper part of the body on the right; *carte*, which protects the left upper part; and the *seconde*, which protects the lower part. A *riposte* is a quick return thrust after a parry, and a *remise*, the second of two thrusts given on the same lunge. A beat with the right foot is called an *appel*, and a beat of the blade against that of the opponent is known as a *battement*; while a *flanconnade* is a thrust made at the opponent's side under his arm.

The weight of the *sabre* (or sword) is against its use for thrusting in fencing, and leaves it with few of the powers of the rapier for attack or defense. Nevertheless its point makes it a valuable weapon for a thrust on occasions. The cut, the guard, and the point are the three actions both in sabre-fencing and in sabre against lance or bayonet. In one-third of the blade from the point the greatest force of the blow is concentrated (and the sabre is expressly fashioned for cutting by a sharp and heavy blow); this is called the *center of percussion*, and is relied upon for attack. In about a third of the blade from the hilt, the *forte*, lies the strength for defense.

FÉNELON, BERTRAND DE SALIGNAC (1523-89), Fr. diplomatist; ambassador to England at period of St. Bartholomew massacre.

FÉNELON, FRANÇOIS DE SALIGNAC DE LA MOTHE (1651-1715), Fr. ecclesiastic and author; *s.* of the Comte de F.; became tutor to the Duke of Burgundy, and subsequently abp. of Cambrai; his sympathy with, and defense of, Madame Guyon, the Quietist, involved him in prolonged theologica controversy, and his didactic nove *Telemaque*, gave offense to Louis XIV His other works include a treatise o the *Education of Girls*, *Dialogues of th Dead*, *Maxims of the Saints*.

FENESTELLA, Rom. historian of th age of Tiberius.

FENESTRATION, term in arch relating to the arrangement of windo spaces.

FENIANS, brotherhood of Irishme formed in New York by John O'Mahon in 1857, to secure independence of Ir land; spread rapidly among Irishme all over world; not only made variou unsuccessful attempts to raise insurre tion in Ireland, but also essayed invasio of Canada in 1866 and 1870; became secret society in 1872. In 1882 th Phœnix Park Murders, and in 1883-8 the existence of a society advocatin use of dynamite, showed a developme of Fenian spirit.

FENN, GEORGE MANVILLE (183 1909), an English novelist, the author nearly 200 books of adventure for bo and girls. In some of his books h collaborated with other writers, such a G. A. Henty. Among his best know books, and perhaps the most appreciate by boys, were: *In Freedom's Caus Dick o' the Fens*, and *Quicksilver*.

FENN, HARRY (1838-1911), Ame ican artist; *b.* Richmond, England. A the age of 18 he came to the Unite States and engaged in the work of boo illustration in which he speedily attaine a great reputation. He helped to foun the American Water Color Society, an was one of its most notable exhibitor He lectured widely on Oriental subjec and was honored with a gold medal the Columbian Exposition in 189 Among his works may be cited *Pictu esque America, Picturesque Europe,* an *Picturesque Palestine.* His feeling f nature was marked, and his drawing are characterized by remarkable del cacy of perception and perfection finish.

FENN, WILLIAM WALLACE (1862 Theologian; *b.* at Boston. Educate at Harvard College. Was a ministe of the Unitarian Church since 188 At Pittsfield, Massachusetts, was minister of the Unity Church from 188 1891. At Chicago 1891-1901 was member First Unitarian Society. Fro 1896-1898 and 1902-1905 was preache to Harvard College. Professor of sy tematic theology since 1901. Sinc 1906 dean of Harvard Divine Schoo Author, in 1890, of *Lessons on Luk*

Lessons on Acts, 1894; *The Flowering of the Hebrew Religion*, 1894; *Lessons on Psalms*, 1900. Fellow of American Academy of Arts and Sciences.

FENNEL (*Foeniculum*), plant with yellow aromatic flowers; used in sauces as carminative and condiment; a genus of L. Umbelliferæ.

FENOLLOSA, MARY MCNEILL ('Sidney McCall'), American author; *b.* Mobile, Ala. She was educated at Irving Academy, Mobile, and later traveled extensively in Europe and Japan. In the latter country she resided for eight years and became deeply interested in Japanese life. Her publications include *The Dragon Painter*, under the pseudonym of 'Sidney McCall', 1906; *Truth Dexter*, 1906; *Red Horse Hill*, 1909; *Sunshine Beggars*, 1918; and *Christopher Laird*, 1919.

FENRIR (Norse myth.), monster wolf; offspring of Loki.

FENS, district, E. of England, embracing parts of Lincolnshire, Northhamptonshire, Huntingdonshire, Cambridgeshire, and Norfolkshire; flat, marshy tract of land round Wash, intersected by rivers and channels. Principal rivers which flow through F. into Wash are Gt. Ouse, Witham, Welland, Nen, and Cam. Preservation of F. depends on preservation of river-banks, hence earthen embankments to protect it from sea and rivers.

FENTON, EDWARD (fl. 1577-1603), Eng. navigator; served under Frobisher, and commanded *Mary Rose* against Armada.

FENWICK, CHARLES GHEQUIERE (1880), political scientist; *b.* in Maryland. Bachelor of Arts at Loyola College in 1907 and Doctor of Philosophy at Johns Hopkins University 1912. From 1911-1914 was law clerk, division of international law, for Carnegie Endowment for International Peace. At Washington College of Law from 1912-14 was lecturer on International Law. Associate 1914-1915 in Political Science. Professor since 1918 at Bryn Mawr College. Member of American Society of International Law, American Academy of Political and Social Science, American Political Science Association. Author of *The Neutrality Laws of the United States*, 1913. In 1920, *Political Systems in Transition.*

FENWICK, SIR JOHN (*d.* 1697), Eng. general; implicated in Jacobite plots against William III.; beheaded.

FERBER, EDNA (1887), American author and playwright; *b.* Kalamazoo, Mich. She was educated in public and high schools of Appleton, Wis., and at the age of 17 began as a reporter on the Appleton Daily Crescent, being connected later with the Milwaukee Journal and Chicago Tribune. The success of her first short stories attained led her to devote herself chiefly to that class of literary work. Her *Emma McChesney* stories especially have had a wide popularity. Her publications include *Buttered Side Down*, 1912; *Roast Beef Medium*, 1913; *Personality Plus*, 1914; *Emma McChesney and Co.*, 1915; *Fanny Herself*, 1917; *Half Portions*, 1919; *The Girls*, 1921; In collaboration with Geo. V. Hobart, she wrote the comedy *Our Mrs. McChesney.*

FERDINAND I. (1793-1875), Austrian emperor; intermittently insane; abdicated in 1848, when his nephew Francis Joseph became emperor.

FERDINAND I.-III., Holy Roman emperors.

FERDINAND I. (1503-64), Emperor of Holy Rom. Empire; *b.* Spain, succ. his *bro.* Charles V., as emperor, 1558; tried to reconcile his R.C. and Prot. subjects.

FERDINAND II. (1578-1637), Emperor of Holy Rom. Empire; gov. of Styria, Carinthia, and Carniola in 1596; king of Bohemia, 1617; of Hungary, 1618; emperor, 1619.

FERDINAND III. (1608-57), Emperor of Holy Rom. Empire; king of Romans, 1636; emperor, 1637.

FERDINAND I-IV., kings of Naples; F. IV. of Naples became F. I. of the Two Sicilies.

FERDINAND I. (1423-94), king of Naples; defeated John of Anjou; warred against Turks, 1480-81; excommunicated in 1489 by Pope Innocent VIII.

FERDINAND II. (1469-96), king of Naples (1495).

FERDINAND IV. (1751-1825), king of Naples; succ. on his *f's* accession to throne of Spain, 1759. After *Austerlitz*, Napoleon conquered Naples and gave it to Joseph Bonaparte.

FERDINAND I., THE GREAT (*d.* 1065), king of Castile; famed for military triumphs and for individual piety.

FERDINAND II. (*d.* 1188), king of Leon, noted for soldierly qualities.

FERDINAND V., THE CATHOLIC (1452-1516), king of Spain; m. Isabella (*q.v.*), of Castille, his cousin, 1469; with her succ. to throne of Castile, 1474 (as Ferdinand V.); as Ferdinand II., succ.

his *f.*, John I., as king of Aragon, 1479; defeated Moors; annexed their last stronghold, Granada, 1492; Navarre, 1515; united whole of Spain under his sway, and forwarded voyages of Columbus.

FERDINAND I. (1865), King of Rumania, succeeded his uncle, King Carol, in Oct. 1914. His *wife* was Princess Marie, *dau.* of the Duke of Saxe-Coburg and Gotha and cousin to King George V. Though a Hohenzollern, Ferdinand declared on his accession that he was first of all a Rumanian, and after the entry of his country into the World War (1916) he was unswerving in his loyalty to the Allied cause.

FERDINAND I. (1861), formerly Czar of the Bulgarians, was the youngest son of Prince Augustus of Saxe-Coburg-Gotha. In the early stages of the World War he intrigued simultaneously with both groups of belligerents, and in July, 1915, when the Allied failure in Gallipoli and other causes seemed to make the step secure, he made a secret alliance with Germany, at the same time remaining outwardly on friendly terms with the Allies. In Sept. he mobilized his army and attacked the hard-pressed Serbians on the flank. Throughout the war Germany found him a most unsatisfactory ally, the slightest movement of the Allies bringing a panic-stricken appeal for Ger. help. His country grew weary of him, and when the Allies opened their final victorious advance in Sept., 1918, he was only kept in power by the presence at Sofia of a Ger. division. When in Oct. the exigencies of the situation caused its removal, he at once abdicated in favor of the Crown Prince Boris, and sought safety in an ignominious flight across the Danube.

FERDINAND, DUKE OF BRUNSWICK (1721-92), Prussian soldier; served in Seven Years War; distinguished at *Prague*; defeated French at *Crefeld* and *Minden*, 1758, 1759; field-marshal, 1758.

FER-DU-LANCE, a lance-headed viper, common in Brazil and some in the West Indies. It belongs to the rattlesnake family and is one of the most dangerous rattlesnakes. It is from 5 to 7 feet long. Its bite is almost certainly fatal.

FERENTINO (41° 41′ N., 13° 16′ E.), town (ancient *Ferentinum*), Rome, Italy; bp.'s see. Pop. 8,000.

FERENTINUM (*c.* 42° 40′ N., 12° 7′ E.), ancient town, Etruria, Italy; birthplace of Emperor Otho (32 A. D.).

FERETORY, in arch., a shrine o memorial chapel.

FERGHANA (40° N., 71° E.) province, Russ. Turkestan, in valley o Syr-Daria; formed in 1876 from khanat of Khokand; inhabitants, chiefly agriculturists, consist mainly of Sarts, Uzbegs, and Kara-Kirghiz; principal towns Marghelan, Khokand, Namangan, anc Andjan. Area, 35,446 sq. miles. Pop 2,000,000.

FERGUS FALLS, a city of Minnesota in Otter Tail co., of which it is the county seat. It is on the Northern Pacific and Great Northern railroads, and on the Red River of the North. The city is surrounded by prairie land and forests of pine and hardwood. It has large woolen and flour mills. It is the seat of the Norwegian Lutheran College, and has a high school, public library, Odd Fellows' Hall, Masonic Temple, Court-House, Hospital for the Insane, banks and newspapers. Pop. 1920, 7,581.

FERGUSON, ADAM (1723-1816), Scot. philosopher and historian; prof. of Natural Philosophy, Edinburgh, 1759; Moral Phil., 1764; wrote *History of the Roman Republic*, and several philosophical works.

FERGUSON, CHARLES (1863), American author; *b.* in New York. Attended University of Michigan from 1882-1884. From 1885-1886 practiced at Buffalo. Was deacon and priest of the Protestant Episcopal Church. Minister of various churches, including All Saints Church, Chicago, St. James Church, Syracuse, Grace Church, Tucson, Arizona. From 1908-1913 was editorial writer for Hearst's Newspapers. From 1913-1914 was in Europe as special Commissioner of United States Government investigating methods of corporate organization in several countries. Was agent of the State Department in the Far East, 1918. Author of *The Religion of Democracy*, 1900; *The Affirmative Intellect*, 1901; *The University Militant*, 1911; *The Great News*, 1915; *The Revolution Absolute*, 1918. Writes for magazines.

FERGUSON, ELSIE (Mrs. Thomas B. Clarke) (1885), American actress; *b.* New York City. She was educated at the New York Normal College and made her first stage debut in *The Liberty Belles* at the Madison Square Theater, N. Y., in 1901. In 1907 she made her first London appearance in *The Earl of Pawtucket*, in which she scored a marked success. She has appeared in many notable productions, including *The Battle*, *Such a Little Queen*, *The Strange*

Woman, The Outcast, and *Shirley Kaye*. In the silent drama she has also stood in the first rank, her best known film vehicles being *Barbary Sheep, Rose of the World, Witness for the Defense*, and *Peter Ibbetson*. She returned to the speaking stage in 1920 in *Sacred and Profane Love*, and in 1921 starred in *The Varying Shore*.

FERGUSON, JAMES (1710-76), Scot. astronomer; *b.* Keith; studied Edinburgh; went to London, 1743, and there lectured on experimental philosophy; principal work, *Astronomy Explained Upon Newton's Principles*.

FERGUSON, JOHN CALVIN (1866), Chinese Government Official; *b.* in Ontario, Canada. Bachelor of Arts, Boston University, 1886, and in 1902 Doctor of Philosophy. From 1888-1897 was president of Nanking University. At Shanghai, 1897-1902, president of Nanyang College. In 1902 was secretary of Chinese Minister of Commerce. From 1903-1907 was chief secretary of Chinese Railway Administration. From 1898-1911 was foreign adviser to viceroys of Nanking. 1900-1910 adviser at Wuchang. At Peking, 1911, was foreign secretary Ministry of Post and Communications. Resigned and devoted himself to art and literary studies. 1915-1917 Counselor to China in the Department of State. Since 1917 adviser to President of China. Raised nearly one million dollars as chairman Central China Famine Relief Committee from 1910-1911. Since 1912 counselor and vice president of Chinese Red Cross. From 1902-1903 was member of Chinese Commission to revise treaties with Japan and United States. Was sent on special missions to United States for Chinese Government. Owned the Shanghai Times from 1907-1911. Has been decorated by French and Chinese Governments.

FERGUSON, ROBERT, THE 'PLOTTER' (*c.* 1637-1714), anti-Catholic agitator under Charles II., and author of *History of the Revolution*, 1706.

FERGUSSON, ROBERT (1750-74), Scot. poet; *b.* Edinburgh; ed. St. Andrews; *d.* in Edinburgh madhouse. His Scots poems exercised a marked influence on Burns, who borrowed from him the measure since known as the 'Burns stanza.'

FERGUSSON, SIR WILLIAM, Bart. (1808-77), Scot. surgeon; surgeon in Edinburgh Royal Infirmary, 1836; prof. of Surgery in King's College, London, 1840.

FERIÆ, Rom. 'free' or festival days, holidays; f. were either special (*imperativae*), ordered for special occasions; or legal (*publicae*), and these were periodically recurrent, like the *Saturnalia* (in mid-December), or held when the priests decided, (*e.g.*) the *Compitalia*. The term f. is applied ecclesiastically to days of the week except Sunday and Saturday, Monday being f. *secunda*.

FERMANAGH (54° 20′ N., 7° 30′ W.), inland county, Ulster, Ireland; almost divided into two parts by Upper and Lower Loughs, Erne; manufactures of coarse linen; chief town, Enniskillen. Area, 715 sq. miles. Pop. 62,000.

FERMENTATION, a change brought about in various substances, especially organic liquids, by agents called ferments, which are of two kinds: *organized* ferments, or living organisms, bacteria, yeasts, moulds; and *unorganized* ferments or enzymes, or soluble chemical substances. In order to bring about f. by organized ferments the organisms must be alive and growing, and certain conditions are necessary for their growth. Suitable nourishment and sufficient moisture must be present, the temperature must be within a certain limited range, about blood-heat, some of the organisms require the presence of oxygen, while various poisonous substances, (*e.g.*) acids or alcohols in too great quantity, or antiseptics, will kill them and thus prevent f.

These organisms are either unicellular masses of protoplasm, *bacteria*, which multiply by fission of the cells; or more highly developed cells which multiply by budding, *yeasts*; or still more highly developed organisms, which branch freely and multiply by the formation of special organs, *moulds*. They live on nutritive substances in the liquid and give out products, allied to the unorganized enzymes, which break down the more complicated organic substances in the liquid, (*e.g.*) sugars, into simpler substances, (*e.g.*) alcohols and carbon dioxide, this process receiving the name of f. Alcoholic f. is the most important economically, and, (*e.g.*) in the making of *beer*, it is caused by yeast (*Saccharomyces cerevisioe*) acting on solutions of sugars, glucose, or dextrin, extracted from malt, and changing them into alcohol, carbonic acid gas, and small quantities of other substances which give the liquid its special flavor.

The most important unorganized ferment is *diastase*, which is contained in malt, and changes starch into glucose, while others are ptyalin in the saliva, and pepsin in gastric juice, which have much the same properties.

FERMENTATION. See Bread.

FERMO (43° 11′ N., 13° 43′ E.), town (ancient *Firum*), Italy, 4 miles from Adriatic; cathedral; archbishop's see; trade in grain, silk, and wool; was Rom. colony founded 264 B. C.; remains of Rom. walls. Pop. 17,000.

FERMOY (52° 8′ N., 8° 16′ W.), market town, on river Blackwater, County Cork, Ireland; has R.C. coll.; military barracks; salmon-fishing. Pop. 6,100.

FERNALD, BERT M. (1858), American legislator; *b.* West Poland, Maine. He studied at public school in his native town and at academic and preparatory schools in Boston. He took an active part in political affairs, served in the lower House and Senate of the Maine legislature and was elected Republican Governor of Maine, 1909-11. In 1916 he was made U. S. Senator to fill out the unexpired term of Edwin C. Burleigh, deceased, 1916-19, and was reelected for the term 1919-25. He has been in the cannery business since 1888, and has been connected as president, officer or director with many large corporate enterprises.

FERNALD, CHARLES HENRY (1838-1921), American zoologist; *b.* Mt. Desert, Maine. During the Civil War he served as acting ensign in the navy; from 1871 to 1886 he was professor of natural history at Maine State College. In the latter year he became professor of zoology at the Massachusetts Agricultural College, at the same time serving as entomologist to the State Board of Agriculture. His publications include *Tortricidae of North America*, 1882; *The Brown-Tail Moth*, 1903; and *The Genera of the Tortricidae and Their Types*, 1908.

FERNALD, CHESTER BAILEY (1869), American author and playwright; *b.* Boston, Mass. He was educated under private tutors and at the Episcopal Academy, Philadelphia. He went to California in 1889, where for four years he was an assistant draftsman in the navy service. In 1893 he became Washington correspondent for the San Francisco Chronicle, and following 1894 traveled extensively in foreign countries, settling in England in 1907. His publications include *The Cat and the Cherub*, 1896; *Chinatown Stories*, 1899; *Under the Jackstaff*, 1904; *John Kendry's Idea*, 1907; and *The White Umbrella*, 1919. Of his many plays may be cited *The Cat and the Cherub*, 1897; *The Moonlight Blossom*, 1899; *The Married Woman*, 1911; *The Pursuit of Pamela*, 1913; *The Day Before the Day*, 1915; *The Jest*, 1920; and *The Love Thief*, 1921.

FERNANDEZ, ALVARO (fl. 1450) Portug. voyager to W. Africa.

FERNANDEZ, JUAN (XVI. cent.) Span. navigator; discovered the islands 1563, which bear his name—island associated with the castaway, A. Selkir or Robinson Crusoe.

FERNANDO DE NORONHA (3° 50 S., 32° 30′ W.), island in S. Atlantic off coast of Brazil; penal settlement.

FERNANDO PO (3° 30′ N., 8° 47′ E.) island, W. coast of Africa, in Bight o Biafra; capital is Santa Isabel; coas steep, inland mountainous; principa peak, Mt. Clarence (*Span.* Pico Santa Isabel). Vegetation luxuriant; cocoa, coffee, sugar, tobacco, and vanilla plantations; inhabitants European, Bantus, negroes. Discovered XV. cent. by Portug. navigator Fernão do Po; now under Span. gov-gen. Area, 780 sq. miles. Pop. *c.* 25,000.

FERNEY (46° 15′ N., 6° 6′ E.), town, Ain, France; associations with Voltaire. Pop. *c.* 2,000.

FERNIE, a city of British Columbia, Canada, in the Kootenay district. It is on the Canadian Pacific, the Great Northern and other railroads, and is near the Elk river. It is a port of entry and the headquarters for the provincial police of East Kootenay. It is the center of an important hunting region. Its industries are important and include sawmills, railway car shops, breweries, brick works, etc. In the neighborhood are the famous Crow's Nest Pass coal mines. Pop. about 8,000.

FERNS. See PTERIDOPHYTA.

FEROZEPUR, FIROZPUR (30° 56′ N., 74° 48′ E.), town and district, Punjab, Brit. India, near the Sutlej; contains important arsenal; commercial center. Pop. 1921, 50,836. District: area, 4,302 sq. miles; pop. 959,000.

FEROZESHAH (30° 53′ N., 74° 49′ E.), village, Punjab, Brit. India; scene of Brit. victory over Sikhs, Dec. 21, 1845.

FERRARA (44° 50′ N., 11° 39′ E.), capital of F. province, N. Italy, 3— miles S. of Po; cathedral (begun XII. cent.) and other fine churches; birthplace of Tasso and Guarini. Pop. 100,000. Province: area, 1,012 sq. miles; pop. 310,000.

FERRARA, ANDREA (fl. late XVI. cent.), Ital. sword-maker.

FERRERO, GUGLIELMO (1872), Italian historian; *b.* near Naples. He received his education at the University of Bologna and studied law at Pisa. He devoted himself chiefly however to authorship and quickly achieved a reputation as an economist and historian. His early literary efforts were produced in collaboration with Lombroso and other criminologists. His radical views at times brought him into conflict with the authorities. The historical work on which his fame mainly rests is *The Greatness and Decline of Rome*, 1902-08. He lectured in Milan in 1898, in France in 1906, made a South American tour in 1907 and in 1908 lectured in the United States. His publications include, besides the one previously mentioned, *Characters and Events of Roman History*, 1908; *Between Two Worlds*, 1913; *Ancient Rome and Modern America*, 1914.

FERRERS, Norman Eng. family, which held large fiefs after Conquest; held earldom of Derby, 1138-1266; barony, 1299-1450, when it passed to Devereux family, afterwards to Shirley, who have been Earls Ferrers since 1711.

FERRET. See Weasel Family.

FERRI, CIRO (1634-89), Rom. painter; follower of Pietro da Cortona; painter of frescoes, etcher, architect.

FERRICYANOGEN, radical, non-existent in free state, forming ferricyanides, (*e.g.*) potassium ferricyanide $(FE_2(CN)_{12}K_6)$, formed by union of potassium ferrocyanide and chlorine, and used in manufacture of blue dyes (Turnbull's blue).

FERRIER, JAMES FREDERICK (1808-64), Scot. philosopher; *b.* Edinburgh; prof. at Edinburgh and St. Andrews.

FERRIER, SUSAN EDMONSTONE (1782-1854), Scot. novelist; pub. anonymously *Marriage*, 1818; *The Inheritance*, 1824; and *Destiny*, 1831.

FERRIS WHEEL, a gigantic wheel first exhibited at the Chicago World Exhibition, in 1892. It was a remarkable engineering feat. Its diameter was 270 feet and its circumference 825 feet. The axle was a steel bar 45 feet long and 2 feet thick. The 36 cars on the wheel each seated forty persons, the wheel and passengers weighing 1200 tons. The wheel was imitated and exhibited at later exhibitions.

FERRO, HIERRO (27° 43′ N., 18° W.), one of the Canary Islands; famous as first meridian chosen by Fr. scientists, 1630.

FERROCYANOGEN, radical, non-existent in free state, forming ferrocyanides, (*e.g.*) potassium ferrocyanide, formed by union of potassium cyanide and water in iron vessels, and used in manufacture of blue dyes (Prussian blue).

FERROL (43° 29′ N., 8° 13′ W.), fortified seaport; prov. Corunna, Spain; chief Span. naval arsenal; excellent harbor; extensive dockyards; contains naval school; textiles, naval stores, sardine-fishing. Pop. 26,000.

FERRUCCIO, FRANCESCO (1489-1530), Florentine soldier; took Volterra, 1530; captured at *Gavinana*, and killed by Maramaldo.

FERRY, public passage across a water-space; also the boat used for such purpose. Before bridges became common, the f. was an important means of transit.

FERRY, FREDERICK CARLOS (1868), American educator; *b.* Braintree, Vt. He graduated at Williams College in 1891 and later pursued studies abroad at Norwegian and German universities. He taught Latin, Greek and mathematics at Williams College from 1891 to 1917, in the latter year being made president of Hamilton College, Clinton, N. Y. In 1921 he served as trustee of the Carnegie Foundation for the Advancement of Teaching. He has written many articles on geometrical subjects for publication in various periodicals.

FERRY, JULES FRANÇOIS CAMILLE (1832-93), Fr. premier; attacked Jesuits in education bills; responsible for acquisition of Tunisia and general policy of expansion.

FERSEN, FREDERIK AXEL, COUNT VON (1719-94), Swed. soldier and politician; served with distinction in Seven Years War.

FERSEN, HANS AXEL, COUNT VON (1755-1810), Swed. soldier and statesman; served in Finland, 1788; aided Fr. royal family at Revolution; took no part in Swed. Revolution in 1809; killed by mob at funeral of Crown Prince of Sweden.

FERRY, THOMAS WHITE (1827-96), American public official, *b.* in Mackinaw, Michigan. In 1850 he was elected to the Michigan Legislature and from 1864 to 1871 served in the House of Representatives. He was elected to the Senate in 1871, serving until 1883. On the death of Vice-President Wilson in 1875, as president pro tempore of the Senate he became acting vice-president.

FERTILIZATION. See Pollination Fertilizers. See Agriculture.

FESA, FASA (28° 53′ N., 53° 43′ E.), town, Fars, Persia; silk manufactures; dates and tobacco. Pop. *c.* 4,000.

FESCENNIA (*c.* 42° 20′ N., 12° 30′ E.), ancient city, Etruria; said to give name to ancient Rom. songs. Fescennine Verses, early kind of Lat. poetry, employed at harvest festivals. The verses were often of coarse and obscene character.

FESS, SIMEON D. (1861), Congressman; *b.* in Ohio. Bachelor of Arts, Ohio Northern University in 1889 and Doctor of Laws, 1900. Head of College of Law from 1896-1900 and vice president, 1900-1902, Ohio Northern University. 1902-1907 student and lecturer of Chicago University. 1907-1917 at Antioch College, was president. Member of Congress from 1913-1915 and from 1915-1923. He was elected to the Senate in 1922. In 1918 Chairman National Congressional Campaign Committee. Author of *Outline of United States History*, 1897; *Outlines of Physiology*, 1899; *Political Theory*, 1917. He was editor of *Worlds Events*, 1903-1906.

FESSENDEN, WILLIAM PITT (1806-1869), American lawyer and statesman; *b.* in Boscawen, New Hampshire; *d.* at Portland, Maine. Graduating from Bowdoin College in 1823 he was admitted to the bar in 1827. Entering political life he was elected to the United States Senate by the Whig Party in 1854. A week after he appeared in the Upper House he made a speech against the Kansas and Nebraska Bill which at once placed him in the first rank of orators of that day. During the Civil War he labored to establish the National credit. He was appointed Secretary of the Treasury in 1864 and having adjusted the National finances he resigned in 1865 and returned to the Senate.

FESTOON, garland of flowers, fruit, or leaves, arranged in a curve, for decorative purposes; used also for anything arranged in such manner. In sculpture and arch., an ornamental relief to imitate a real garland.

FESTUBERT, a small village several miles south of Neuve Chapelle, the scene of heavy fighting between French and British and the German forces during the World War, especially giving its name to a battle which was fought in the immediate vicinity in May, 1915. It was then that the British made a forward movement to relieve pressure on the French in the Artois region, and to prevent the Germans from sending reinforcements and artillery to Lens. The action began on May 9th, lasting all day, but ended with disastrous loss to the British on account of their lack of high-explosive shells. The result of this battle was to rouse a storm of public indignation in England, on account of this shortcoming, which became so intense as to cause changes in the Cabinet, a Department of Munitions being formed for the purpose of organizing the manufacture of munitions on a scale larger than ever. In this regard the disaster of Festubert had a wholesome effect on later developments of the war on the Western front.

FESTUS, PORCIUS, Rom. procurator of Judæa, before whom St. Paul was tried 62 A. D. (*Acts 25*).

FESTUS, SEXTUS POMPEIUS (fl. II. cent. A. D.), Lat. scholar; his abstract of Flaccus's *De Verborum Significatione* was edit. by K. O. Müller, 1839.

FETISHISM, a word used with varying meaning to signify the cult of inanimate objects, particularly when supposed to be inhabited by some deity or spirit. Fetish is often used for the figure or idol wherein the god resides, also for a charm possessed with the potency of the deity. The W. Africa *ju-ju* is a type of fetish.

FEUDALISM, system of social organization which arose among the nations of Europe on the disruption of the Rom. Empire. It is primarily an association for purposes of safety, the weaker folk placing themselves under the care of an *overlord*, and surrendering to him their lands, which they subsequently received again on feudal tenure. In return for the protection extended to them by the overlord they did *homage* and swore *fealty* to him, and undertook to serve him on field of battle; they thus became his followers, living on land allotted to them and looking to him for justice and safety. With the growth of nationalities, local feudal lords became a menace to royal power; but the tendencies of the continental systems were modified in England by the statesmanship of William the Conqueror. The system he introduced may be said to represent both the purely feudal European system and that of the former kings of England, although in many respects it differed from both. As the successor of Edward the Confessor, William retained the older administrative and judicial organization of the country; as the conqueror, he established a system of military organization, in order to secure the possession of his conquests; and by distributing widely the lands of the more powerful barons, and constituting himself the direct overlord of every freeman in England, compelling each to swear allegiance to him before all intermediaries, he established a more centralized form of government than was possible in France and Germany, where each great feudal lord had a large number of *vassals* who were bound to support him even against the king should occasion arise. Various forms of feudal service due from vassal to overlord included military and court service; *aids* and *reliefs* also had to be paid, and the overlord had rights of *wardship* of heir during minority and of marriage of heiress.

FEUERBACH, LUDWIG ANDREAS (1804-72), Ger. philosopher; reduced Hegelianism to naturalism; denied immortality. Combining Spinoza's substance and Fichte's Ego, F. held that the only absolute is the sense-endowed man; that only the sensible is real, and that truth is perceived by the educated senses.

FEUILLANTS, Fr. political club founded in Revolutionary times by various members of Jacobin Club; ceased to exist soon after Aug. 10, 1792.

FEUILLET, OCTAVE (1821-90), Fr. novelist and dramatist; his French is notable for its purity, and his writings enjoyed marked popularity.

FEUILLETON, portion of a newspaper devoted to literary and scientific articles, and especially to novels in serial form and light lit.

FEVER, general term applied to elevation of the normal temperature of the body, due either to disturbance of the nervous system, to disturbance of the heat-losing apparatus of the body (*i.e.* the skin, respiratory system, etc.), or, most usually, to the action in the body of various bacterial or other poisons, which cause increased breaking down of protoplasm, diminish the loss of heat from the body, and interfere in various ways with the functions of the organs of the body. A temperature higher than 106° F. in the human body is very dangerous. A remedy that allays fever is known as a febrifuge.

FEVERFEW, composite plants; best known is Wild F. (*Matricaria parthenium*), a strong-smelling evergreen.

FEVERWORT, HORSE GENTIAN (*Triosteum*), plant of order *Caprifoliaceae*; berries of Amer. variety used as substitute for coffee.

FEW, WILLIAM PRESTON (1867), American college president; *b.* at Greenville, South Carolina. Bachelor of Arts, Wofford College, 1889, and at Harvard College, 1896. Doctor of Philosophy. At Durham College was professor of English, dean and since 1910 president. Co-editor of South Atlantic Quarterly from 1909-1919. Writer and speaker on social and educational questions.

FEZ (34° 6′ N., 4° 53′ W.), largest city, Morocco, to which it was annexed, 1548; now one of its capitals; formerly capital of a Moorish kingdom; celebrated for centuries as a holy city, and once famous as a seat of learning; is surrounded by walls; has many fine mosques, univ., and the Sultan's palace; commercial center; active caravan trade; manufactures woolen, morocco leather goods, gold and silver ware; was besieged by Berbers and other tribes supporting Mulai Zin, the *bro.* of Mulai Hafid, in his claim to sultanship (1910), and was relieved by Fr. troops; inhabitants chiefly Moors, Arabs, Berbers, Jews. Pop. *c.* 140,000.

FEZZAN (26° 30′ N., 16° E.), region of Sahara; Italian province to S.E. of Tripoli; capital, Murzug; shut in N., S., and E. by Sahara and hills; climate very dry, but healthy, except for malaria; soda obtained from salt lakes in N.W., only export trade. Pop. *c*, 43,000.

FIALA, ANTHONY (1869), an American Polar explorer; *b.* in Jersey City, N. J. He began his career as a lithographer but later took up newspaper work, being correspondent for the Brooklyn Daily Eagle in Cuba during the Spanish-American War. During 1901-2 he accompanied the Baldwin-Ziegler Polar Expedition as photographer. During 1903-5 he was in command of the Ziegler Polar Expedition, reaching 82° 4′ North. In 1913-4 he was ex-President Roosevelt's companion on an exploring trip through Brazil. He has written two books covering his experiences, *Troop C in Service*, 1899; and *Fighting the Polar Ice*, 1906.

FIBRIN, a protein which appears in the blood when it escapes from the body, due to the action of the fibroferment, which comes probably from the white corpuscles or blood-platelets, on the fibrinogen contained normally in the blood, the presence of which gives rise to coagulation.

FICHTE, IMMANUEL HERMANN VON (1797-1879), Ger. philosopher; ed. Berlin; defended his *f.'s* philosophy against Hegel.

FICHTE, JOHANN GOTTLIEB (1762-1814),Ger. philosopher; founder of Subjective Idealism; *b.* Lusatia; studied theology at Jena and Leipzig; prof. at Jena, 1794-99, dismissed on charge of atheism, and finally Rector of new Berlin Univ.

FICHTELGEBIRGE (50° 2′ N., 12° E.), mountain group, Bavaria, N.E. of Baireuth; highest peak, Schneeberg, 3450 ft.

FICINO, MARSILIO (1433-99), Ital. philosopher; *b.* Arno valley; *s.* of eminent physician; translator, editor, commentator of Plato and Alexandrians.

FICKE, ARTHUR DAVISON (1883), American poet and writer; *b.* in Davenport, Ia., November 10, 1883. He graduated from Harvard in 1904 and the College of Law State University, Iowa. Taught English at the State University of Iowa and was admitted to the bar in 1908. Publications, volumes of poems, *From the Isles*, 1907; *The Earth Passion*, 1908; *The Breaking of Bonds*, 1910; *Sonnets of a Portrait Painter*, 1914; *An April Elegy*, 1917. In prose *Twelve Japanese Painters*, 1915; *Chats on Japanese Painters*, 1915. He was a captain in the Ordnance Dept from August 1917 to July 1919 with final rank of Lt. Colonel.

FICKSBURG (29° S., 27° 48′ E.), town, Orange Free State, S. Africa.

FICTION, see Novel, and also under literature of different countries.

FIDDLE (Lat. *fidula*), old term for any stringed instrument, generally violin; now popular or derogatory name for violin.

FIDEI COMMISSA, in Rom. law, trusts formed to carry out will of one deceased; clumsy law often nullified wills, and *f.* remedied abuses by allowing a dying person to bequeath property to one who should hand it on to another.

FIDENÆ, modern Castel Guibileo (*c.* 42° N., 12° 30′ E.), ancient city, on Tiber, Italy.

FIDUCIARY, legal term for something held in trust.

FIEF, land held in fee of a superior.

FIELD ARTILLERY. See ARTILLERY.

FIELD, CYRUS WEST (1819-1892), an American capitalist, *b.* in Stockbridge, Mass. His schooling ceased at the age of fifteen, when he went to work, eventually becoming a paper merchant. Before reaching the age of forty he had made a fortune in business. He then practically retired, but had meanwhile become interested in ocean telegraphy. In 1854 he procured from the Newfoundland Government, a legislative enactment which gave him the exclusive right of laying a cable across the ocean that should be landed there and continued on to the United States, this privilege to endure for fifty years. He next set about the financial promotio of his scheme and organized a corporation to back him in his venture. At th first attempt to lay the cable, from th Great Eastern, the cable broke, an was only recovered after a second attem was made. Cable communication between England and the United State was finally effected in 1866. After havin achieved this great enterprise, M Field became interested in promotin the building of the elevated railroads New York.

FIELD, DAVID DUDLEY (1781 1867), Congregational clergyman; *b.* a East Guilford (now Madison), May 2 1781; *d.* at Stockbridge, Mass., April 1 1867. Graduating from Yale in 180 he was pastor at Haddon, Conn., 180 1818; in 1819-1837 of the church a Stockbridge, and resumed his pastorat at Haddon 1837-1851. He publishe *Histories of Middlesex and Berkshi Counties* and a *Life of Daniel Brainer*

FIELD, DAVID DUDLEY, JR., (180 1894), American jurist. *b.* at Haddo Conn., February 13, 1805; *d.* in Ne York, April 13, 1894. Graduating fro Williams College in 1825 he studied la was admitted to the New York Bar 1828 and practiced until 1885, specia izing on judiciary reform. In 1857 th State appointed him to prepare a political, civil, and penal code. New Yor adopted the last, and many states a three. In 1866 his proposal to th British Social Science Congress, that committee be formed of the representatives of all great nations to sketch ou an international code, was the subjec of a report at the Congress in 1873. Ou of this grew an association for reformin the law of nations, instituting arbitration for war, and of which Mr. Fiel was the first president. Although Democrat he strongly supported Lincol in the Civil War. He filled a brie vacancy in Congress in 1876. See hi *Speeches, Arguments and Miscellaneou Papers*, 1884-1890.

FIELD, EUGENE (1850-1895), American poet and humorist. *b.* at St. Loui Mo., September 2, 1850; *d.* at Chicag November 4, 1895. He studied a Williams and Knox Colleges, and th University of Missouri, but cannot b said to have learned much. Havin inherited some money on his father' death he went to Europe and afte wanderings, returned happy but penn less to America. Soon after, he marrie Miss Julia Constock, of St. Joseph Mo., and entered journalism. He wa on the St. Joseph Gazette, 1875-187 editorial writer St. Louis Mornin Journal and Times-Journal, 1876-188 managing editor Kansas City Times, 1880-1881; managing editor Denver Tribune, 1881-1883; and special writer on Chicago Daily News and Chicago Record from 1883 until his death. Ill health sent him to Europe a second time in 1889. He enjoyed a wide reputation for his humorous verse and sketches from which he gave public readings. *Christian Treasures*, 1879; a volume of verse was his first book. Among other publications are *The Denver Tribune Primer*, 1882; *Culture's Garland*, 1887 *Echoes from the Sabine Farm*, 1891; *A Little Book of Profitable Tales*; *With Trumpet and Drum*, 1891; *Holy Cross and Other Tales*, 1893; *Dibden's Ghost*, 1893; *Facts, Confessions, and Observations*, 1896; *Second Book of Tales*; *Field Flowers* and *Lullaby Land*, 1897. See THOMSON S., for *Life*.

FIELD GLASS. See TELESCOPE.

FIELD, HENRY MARTYN (1822-1907), Clergyman and scholar. *b.* at Stockbridge, Mass., April 3, 1822; *d.* there January 26, 1907. Graduating from Williams College he entered the ministry in 1842 and became editor and proprietor of the N. Y. Evangelist in 1854. Publications, *History of the Atlantic Telegraph*, 1866; *From the Lakes of Killarney to the Golden Horn*, 1876; *From Egypt to Japan*, 1878; *Among the Holy Hills*, 1883; *The Greek Islands and Turkey After The War*, 1885. *The Barbary Coast, Old Spain and New Spain, Gibraltar*, etc.

FIELD, KATE (1840-1896), American writer, lecturer and actress. *b.* at St. Louis, Mo. She showed an early taste for writing and resided in England for some time contributing to American newspapers and magazines. On her return to America she gave lectures and readings and appeared at Booth's Theater as *Peg Woffington*. In 1882-83 she founded a Dress Co-operative Association in New York, which failed. In 1889 she published a weekly paper *Kate Field's Washington* at the national capital.

FIELD, MARSHALL (1835-1906), American merchant, *b.* at Conway, Mass. Was a clerk in a dry-goods firm, and became partner; 1865 was a member of a firm which later, in 1881, became Marshall Field and Co. This was the largest dry-goods firm in the U.S., and had branches in Europe. He gave large gifts to Chicago University, and founded the Field Columbia Museum.

FIELD, NAT (1587-1633), Eng. dramatist and actor; wrote two comedies, *A Woman is a Weathercock*, and *Amends for Ladies*, collaborated with Massinger and Fletcher.

FIELD, STEPHEN JOHNSON (1816-1899), American jurist. *b.* at Haddon, Conn., November 4, 1816; *d.* at Washington, D. C., April 9, 1899. A second *s.* of Rev. D. D. Field and *bro.* to Cyrus, inventor of the Atlantic cable. He went to Smyrna with his missionary brother-in-law at 13, and spent three years there and at Athens studying Greek. Returning to America he graduated from Williams, studied law in New York and was admitted to the bar in 1848. He joined the gold rush to California in 1849, locating at Yubaville (now Marysville), becoming Alcalde under an old Mexican law until the judiciary was organized. A member of the legislature in 1850 on the Judiciary Committee, he framed laws for miners and mining which other states adopted. He was appointed judge of the Supreme Court of California in 1857; Chief Justice in 1859, and in 1863 Lincoln made him an associate justice of the Supreme Court of the U.S., where he remained until 1897. In 1876 he was one of the Electoral Committees which decided the election in favor of Hayes against Tilden. He was regarded as a great authority on constitutional law

FIELD OF THE CLOTH OF GOLD, meeting between Henry VIII. of England and Francis I. of France, near Calais (June 1529); so called because of the splendor displayed on both sides.

FIELDING, HENRY (1707-54), Eng. novelist; *b.* Glastonbury; *s.* of an army officer; ed. Eton and Leyden; thrown upon his own resources, he turned his attention to the London stage, and between 1730 and 1736 produced a number of plays long since forgotten. He married Miss Cradock, a small heiress, in 1734, and after having dissipated her fortune, again turned playwright and theater-manager, but with little success. He subsequently studied law; was called to the Bar, and joined the Western Circuit, eventually becoming a magistrate and the recipient of a pension. F. discovered the true bent of his genius when, after the publication of Richardson's *Pamela*, he commenced to write *Joseph Andrews*. F.'s first novel was pub. in 1742, and met with some success. It was followed by other notable productions, including his powerful satire, *Jonathan Wild the Great*, *Tom Jones* 1749; *Amelia*, 1751; and numerous other works.

FIELDING, HON. WILLIAM STEVENS (1848), Canadian statesman, prime minister of Nova Scotia (1884-96), when he became minister of finance in Dominion cabinet; negotiated commercial arrangements with Germany, U.S., Italy, and Belgium, (1909-10).

FIELD-MARSHAL, a Brit. military honor which, since 1736, has been the highest in the English army; selection rests with the king.

FIELDS, ANNIE (ADAMS) (1834-1915), Amer. poet and writer; *b.* at Boston, June 6. Married James T. Fields, publisher and writer (*q.v.*), publications *Under the Olives*, poems, 1881; *Biography of J. T. Fields*, 1884; *The Singing Shepherd*, *Authors and Their Friends*, *A Shelf of Old Books*, 1896; *Life and Letters of Harriet Beecher Stowe*, 1897; *Whittier*, *Nathaniel Hawthorne*, 1899; and *Charles Dudley Warner*, 1904.

FIELDS, JAMES THOMAS (1817-1881), author and publisher. *b.* at Portsmouth, N. H., December 31, 1817; *d.* in Boston, April 24, 1881. In 1834 he became the junior partner in the book publishing firm of Ticknor, Reed and Fields, later Ticknor and Fields, and then Fields and Osgood. Editor of The Atlantic Monthly, 1862-1870. Author of *Poems*, 1840; *Yesterdays with Authors*, 1872; *Hawthorne*, 1875; *In and Out of Doors With Charles Dickens*, 1876; *Ballads, and Other Verse*, 1881. Edited with E. P. Whipple *Library of British Poetry*.

FIENNES, NATHANIEL (*c.* 1608-69), Eng. politician and soldier; Roundhead in Civil War; distinguished at *Worcester* and *Edgehill*; sentenced to death for surrendering Bristol to Royalists in 1643, but pardoned.

FIESCHI, GUISEPPE MARCO (1790 1836), Corsican criminal; attempted assassin of Louis Philippe; guillotined.

FIESCO, GIOVANNI LUIGI (*c.* 1523-47), Count of Lavagna, Genoese noble; planned conspiracy to destroy Doria family and overthrow government; succeeded in neither object.

FIESOLE (43° 50′ N., 11° 18′ E.), town, ancient Fæsulæ, on hill above Arno, near Florence, Italy; one of ancient Etruscan confederation; native place of painter, Fra Angelico. Pop. 5,000.

FIFE (56° 15′ N., 3° 10′ W.), maritime county in E. of Scotland; bounded on N. by Firth of Tay, on E. by Ger. Ocean, on S. by Firth of Forth, on W. by Perth. Clackmannan, and Kinross shires; county town, Cupar; maximum length and breadth, 41½ and 21 miles respectively. Area is 492 sq. miles. Chief port, Burntisland. Pop. 1921 292,902.

FIFE, a flute-like instrument, generally in B flat or F; chiefly used in military music along with drums; old form 'cross' flute; modern form 'conical.'

FIFE, ALEXANDER WILLIAM GEORGE DUFF, DUKE OF (1849-1912), Scot. nobleman; husband of Princess Louise Victoria Alexandra Dagmar, eldest *dau.* of Edward VII. (*b.* 1867 *m.* 1889, cr. Princess Royal, 1905).

FIFTH MONARCHY MEN, extreme Puritan sect. who looked for the second coming of Christ upon earth to found the V. monarchy foreshadowed in *Daniel*, the successor to the Assyrian, Persian, Macedonian, and Roman empires. The sect was radical in politics; it was dispersed by Cromwell in 1653, and the leaders imprisoned.

FIG (*Ficus carica*), a native of the Mediterranean region, where it has been cultivated since very early times. The leaves are palmate, veined, and stipulate, the stipules acting as bud-protecting structures. The receptacle consists of a hollow, pear-shaped structure, the so-called 'fruit,' with a small opening at the apex.

FIGARO, comic barber; hero of Beaumarchais's comedies, *Le Barbier de Seville* and *Le Mariage de Figaro*; also of operas by Mozart and Rossini.

FIGHTING, PRIZE. See BOXING.

FIGUEIRA DA FOZ (40° 40′ N., 7° 25′ W.), watering-place, at mouth of Mondego, Beira, Portugal; grain, wine, and fruit. Pop. 8,000.

FIGUERAS (42° 15′ N., 2° 54′ E.), town, fortress, Gerona, Spain; various manufactures; taken by French, 1794, 1808, 1811, and 1823. Pop. 11,000.

FIGWORT (*Scrophularia*), wild flowers; *S. nodosa*, knotted f., and *S. aquatica* purple flowers, are common in Britain.

FIJI, archipelago in Pacific (18° S., 177° 40′ W.); about 250 islands, of which some 80 are inhabited, forming a Brit. crown colony. Cap. Suva, on S.E. coast of Viti Levu. Principal islands, Viti Levu, Vanua Levu, and Taviuni; others are Kandavu, Koro, Ngau, Ovalau, and numerous islets, enclosing Koro Sea; larger islands of volcanic formation, and smaller low coral. The surface is rugged and covered with luxuriant vegetation and beautiful hills (3,000 to 4,000 ft.). Larger islands contain open, dry, undulating country, except certain rich tracts along coast of the two largest; many large rivers afford waterways to the rich lands on their banks—fertilized by frequent floodings; good climate and tropical vegetation—fruits abounding; chief food, yam; sugar-cane, cotton, tea, tobacco, and turmeric cultivated; chief exports include bêche-de-mer, mother-of-pearl, and coconut oil. Vanua Batevu is a trading center. Wireless stations at Suva, Labasa, Taviuni, and Savusavu. Inhabitants, of Melanesian-Polynesian stock, formerly cannibalistic and savage, are now mostly all Christianized by Wesleyans. The Fijis were discovered by Tasman in 1643; little known till 19th cent., and ceded by chiefs and people to Britain in 1874. The governor is also high commissioner and consul-general for Western Pacific; the legislative council is partly elected. Rotuma, to N., annexed to Fiji (1881) is administered by a commissioner. During World War Fiji supplied contingent of men for imperial forces, and contributed liberal sums of money for war organizations. Area, 7,083 sq. m.; pop. 1920, 162,604, including 88,680 Fijians and 59,695 Indians.

FILANGIERI, CARLO (1784-1867), Neapolitan soldier and politician; Prince of Satriano. F. fought in Netherlands, Spain, Sicily; reduced Sicily to submission (1849); viceroy of Sicily till 1855; War Minister, 1859.

FILANGIERI, GAETANO (1752-88), Ital. reformer; advocate of free trade; wrote *La Scienza della legislazione*.

FILARIASIS, disease occurring in the tropics, caused by a parasite, *Filaria sanguinis hominis*, which probably enters the body in infected water causing elephantiasis or swelling of the tissues through blocking the lymphatics, milky urine, etc.

FILBERTS are the fruit of the cultivated *Corylus* or hazel; they are oval, elongated nuts that have a mild, oily taste, which makes them pleasant food.

FILDES, SIR LUKE (1844), Eng. artist and book illustrator; was engaged by Charles Dickens to illustrate *Edwin Drood*, and after some years illustrating books and magazines applied himself to painting. Among his pictures are, *A Casual Ward*, *The Return of the Penitent*, *The Widower*, *The Doctor*, etc.

FILE, instrument used for smoothing or cutting metal; consists of steel bar with roughened surface which is broken up into points or ridges; in roughness they vary from 'dead-smooth' to rasps, which are used for coarse working on horn and timber as well as on metal.

The term is also applied to a pointed wire on which letters are affixed by purposes of reference.

FILE FISHES (*Monachanthidoe*), laterally flattened bony fishes, so called on account of their hard, prickly skins; sometimes destructive to pearl fisheries; tropical and subtropical seas.

FILELFO, FRANCESCO (1398-1481), Ital. scholar.

FILIBUSTER (Fr. *flibustier*), pirate or buccaneer; especially applied to U.S. adventurers, who led attacks upon parts of Span. America.

FILIGREE, metal-work, usually composed of fine gold, silver, or copper wire, arranged in delicate patterns, used in decorating jewelry, to which it is soldered. F. has been worked from very early times in Egypt, Greece, India, and other countries.

FILIPESCU, NICOLA (1857-1916), Rumanian statesman, a Conservative in politics, became minister of agriculture (1900). In 1911-12 he took the portfolio of war, and thoroughly reorganized the army, subsequently returning to his former office, which he held till 1913. After the outbreak of the World War he led the section of his party which wished to espouse the cause of the Allies. Later a fusion was effected with the Conservative-Democrats under the joint leadership of Filipescu and Take Jonescu.

FILLAN, ST., FAELAN, name of two saints, whose lives are legendary, supposed to have come to Scotland from Ireland; commemorated on Jan. 9 and June 20. The St. F. whose feast is kept on Jan. 9 is supposed to have evangelized Scotland in VIII. cent.

FILLMORE, MILLARD (1800-1874), 13th President of the United States. *b.* in Cayuga County, N. Y., February 7, 1800; *d.* in Buffalo, March 8, 1874. In his youth he worked on a farm having little opportunity for education. He began the study of law and was admitted to the bar in Buffalo in 1823, practicing first in New Aurora, but in 1830 he became a partner in a law firm in Buffalo. He had already entered politics, having been elected to the N.Y. Legislature, and had helped in repealing the law for imprisoning debtors. Elected to Congress in 1832 as a Whig he was re-elected (except 1835-1837) until 1843. In the House he took a prominent place; was chairman of the Committee of Ways and Means in the 27th Congress, and reported the Tariff Act of 1842, of which he was practically the author. He sought but failed to receive the Presidential nomination in 1844, and the same year was defeated running for Governor of New York by Silas Wright (*q.v.*), Comptroller of New York in 1847, he was elected by the Whig Party vice president on the ticket with Zachary Taylor.

On the death of the president, in July, 1850, he succeeded him as chief executive. He supported the compromise measures, and signed the Fugitive Slave Law, which lost him many friends in the North. In 1852 he established diplomatic relations with Japan. At the National Convention of 1856 he was the Whig candidate for president on the Know Nothing, or American ticket, but only captured one state—Maryland. He took no part in the Civil War, retiring to Buffalo and law practice.

FILLMORE, PARKER (1878), American author. In 1901, University of Cincinnati, Bachelor of Arts. From 1901-1904 was government teacher in Philippine Islands. 1904-1918 was member of firm W. H. Fillmore and Company, Bankers. Author of *The Hickory Limb*, 1910; *The Young Idea*, 1911; *The Rosie World*, 1914; *A Little Question in Ladies Rights*, 1916; *Czechoslovak Fairy Tales*, 1919; *The Shoemaker's Apron*, 1920; *The Laughing Prince*, 1921.

FILM. See PHOTOGRAPHY.

FILMER, SIR ROBERT (*d.* 1653), Eng. political writer; Royalist in Civil War; suffered greatly under Commonwealth; wrote the *Patriarcha*, defending Divine Right.

FILOSA, a group of Amœboid Rhizopods, minute Protozoa, without a clear external coat of protoplasm, and with the body processes (*pseudopodia*) branched, (*e.g.*) Euglypha, a freshwater form protected by hexagonal plates.

FILTER, a cone of unsized paper, felt, etc., mesh of which permits fluid to pass, while retaining solid particles. A hollow cylinder of porcelain retains bacteria when water is pumped through under pressure. Charcoal filters are inefficient because bacteria feed on them, and pass through the enlarged pores.

FILTRATION. See SEWAGE.

FINANCE, the money dealings between man and man, and the business of public revenue and expenditure. It is an item of political economy. F. in personal matters is mainly concerned with the disposal of capital or income in investments, and with the adjustment of expenditure to income: the safety of investments, the proportion of income to be set aside for investment, the raising of additional income, are all questions of personal f. The main question of national f. is the raising of revenue. Today in civilized states the payment of taxes, either direct on income, or indirect through the Customs and Excise, is the main element in national revenue, and legislative sanction is required for the levying of such taxes.

FINANCIAL SYSTEM, UNITED STATES. The Constitution empowered Congress to determine the sources of revenue and its expenditure. Congress hence has authority to contract loans, levy taxes, and to frame and enact measures defining how government moneys received from this and other sources shall be spent. The government balance sheet (or budget) of 1922 showed receipts amounting to $4,103,741,000, of which income and profits taxes contributed $2,086,918,000; other sources of inland revenue $1,121,239,000; and customs (or tariff), $357,544,000. Thus taxation and tariff furnished much of the major part of the total revenue. The balance mostly represented repayments on foreign loans, sales of war supplies and redemption of farm loan bonds. In addition to income, profits and customs dues, the government's source of revenue includes taxes on estates, telegraph and telephone messages, beverages, theater admissions, passenger automobile, various kinds of brokerage businesses, corporation stock, cigar and tobacco manufacturers, circuses and theaters, yachts, real estate conveyances, drafts and checks over $100, ocean passenger tickets and insurance policies. Some of these imposts may be repealed as the requirements of revenue become less exigent through reductions of the government's obligations. The principal expenditures of the government are interest on the public debt (in 1922, $989,485,409), pensions, public buildings, the support of the government departments, executive, legislative, and judicial, and the army and navy.

The national public debt, which in the fiscal year of 1921-2 was about $22,000,000,000, is subject to periodic reduction, due to provision for retirement of bonds and notes made in the annual budget. These payments constitute a considerable item in the Treasury expenditures. The debt is composed of pre-war notes and bonds, which in the period named amounted to $883,784,000; Liberty Bonds, $15,227,151,000; war notes, $4,347,184,000; Treasury War Certificates, $2,078,593,000; and war-savings securities, $664,666,000.

The federal finances have grown in magnitude, especially since the World War. Before that conflict the need of another channel of revenue besides tariff and internal revenue taxes was felt to meet growing outlays, and in 1913 a tax on personal incomes was levied, to be amplified greatly in the war period. In addition to helping to defray interest on the public debt, especially on war bonds held by the people, increased income taxes were necessary to make up for the sacrifice of revenue caused by the curtailment of receipts from liquor taxes due to the enactment of prohibition in 1919. When the government needs temporary funds to meet current obligations, it procures them through the issue of treasury notes, which are taken up by the banks. See BANKING; BUDGET; and DEBTS, WAR.

The financial system of the State governments is similar to that of the national authority. The legislatures exercise the power of determining the raising and spending of moneys, and the executive departments are therefor dependent on legislative appropriations for running the wheels of administration. The revenues of the States are largely derived from taxation of real and personal property and levies on businesses. Some impose an income tax like New York, and there are also inheritance or estate taxes, as well as a growing revenue from automobile registration. Their expenditures, aside from government and departmental needs, embrace the construction and upkeep of schools, libraries, charities, hospitals, correctional institutions, police and fire departments, militia and armories, highways, conservation of natural resources, sanitation, educational and general recreation, parks, reservations, and monuments. The assessable value of real property for taxation purposes varied in 1922 from $15,390,398,000 for NewYork to $169,393,000 for NewHampshire. After New York, the States with the highest assessable realty values were Pennsylvania, Ohio, Massachusetts, Texas, Wisconsin, Indiana, Illinois, Iowa and Kansas. State indebtedness, like national, is a big item. In 1922 New York owed the most ($185,826,000) and Indiana and Texas the least, or well under $500,000. Iowa, Kansas, Nebraska, South Dakota and Wisconsin have no debts.

FINCH FAMILY (*Fringillidae*), a large family of perching birds, with 700 species, found throughout the whole world with the exception of Madagascar, Australia, and New Zealand and the neighboring islands. They are seed-eating birds of small size, characterized by their short, thick, conical beak, with smooth biting edges. There is much variation and much beauty in the coloring of their plumage. Some finches have exceedingly stout, clumsy bills, the lower half being deep and strong; such are the rare Brit. Hawfinch (*Coccothraustes vulgaris*) and common Greenfinch (*Ligurius chloris*), and the N. American Red Cardinal (*Cardinalis virginianus*) and Grosbeaks (*Hedymeles*). Others have less clumsy and deep beaks, (*e.g.*) the familiar Chaffinch (*Fringilla caelebs*), the highly emigratory Brambling (*F. montifringilla*), the Bullfinch (*Pyrrhula rubicilla*), the Canary (*Serinus canarius*), so called because of its abundance in the Canary Islands, the Sparrows (*Passer*, etc.), the Redpolls and Linnets (*Linaria*), the Siskins (*Chrysomitris*). the Rose Finch or Scarlet Grosbeak (*Carpodacus*) of N. Europe, and the curious Crossbills (*Loxia*), easily recognized by the seeming misfit of the two halves of the bill, which cross near the tip. Species of Buntings belong also to this family.

FINCH, FRANCIS MILES (1827-1907), American poet and lawyer. Born at Ithaca, N. Y. Graduating from Yale he joined the bar, and became judge of the N. Y. Court of Appeals in 1881. He helped to organize, and was long identified with Cornell College. His best known poems are *The Blue and the Grey* and *Nathan Hale*. *Blue and the Grey, and Other Verses*, was published in 1900.

FINCHLEY (51° 36′ N., 0° 9′ W.), town, forming N. suburb, London, seven and one-half miles N. W. of St. Paul's. Pop. 40,000.

FINCK, HENRY THEOPHILUS (1854), musical critic; *b.* at Bethel, Missouri. Graduated from Harvard, A.B., 1876. In 1878-1880 he studied psychology at Berlin, Heidelberg, and Vienna. Since 1881 he has been musical critic and editorial writer on the N. Y. Evening Post. Among the first to awaken an interest in Wagner in this country, he has also written much in praise of Chopin, Liszt, Grieg, and MacDowell. It is claimed that he originated the theory that the sentiment of romantic love, as understood in modern times was unknown to the older civilizations and to savages. Publications: *Romantic Love and Personal Beauty*, 1887; *Chopin, and Other Musical Essays*, 1889; *Pacific Coast Scenic Tours*, 1890; *Spain and Morocco*, *Wagner and His Works*, 1893; *Pictorial Wagner*, 1899; *Primitive Love and Love Stories*, *Songs and Song Writers*, 1900; *Grieg and His Music*, 1909; *Success in Music and How It Is Won*, 1909; *Massenet and His Operas*, 1910; *Richard Strauss*, 1917; and *Ten Songs of Ten Composers*, 1917.

FINDLAY, a city of Ohio, in Hancock co., of which it is the county seat. It is on the Toledo and Ohio Central, the Cincinnati, Hamilton and Dayton, the

Cleveland, Cincinnati, Chicago and St. Louis, and other railroads. It is the center of the great oil and gas fields of Ohio. In the vicinity are also extensive beds of clay and great deposits of gravel and sand. Its industries include the manufacture of glass, pressed bricks, furniture, wooden implements, nails. There is also an oil refinery, machine shops, potteries, and rolling mills. Here is Findlay College. Pop. 1920, 17,021.

FINDLAY COLLEGE, a co-educational institution founded in Findlay, Ohio, in 1882, under the auspices of the Church of God. In the fall of 1922 it had a student body of 386 and 20 professors or instructors on its faculty. Its president then was W. H. Guyer.

FINE ARTS. See ARCHITECTURE, ART, PAINTING, MUSIC, etc.

FINGAL. See FINN.

FINGER-PRINTS. The use of finger-prints for ceremonial purposes is of early date. Its employment, however, for criminal identification was introduced in the late 19th Century. As the skin-markings of the fingers remain the same from childhood to old age, it has been found extremely valuable. Impressions are taken by placing the bulb of the finger on an inked slab and afterwards pressing it on a white paper slip. The slips are classified under various headings, of which the principal are 'loops,' 'arches,' 'whorls,' and 'composites.'

FINIAL, in Gothic arch., usually a foliage ornament forming the termination of gables, spires, etc.

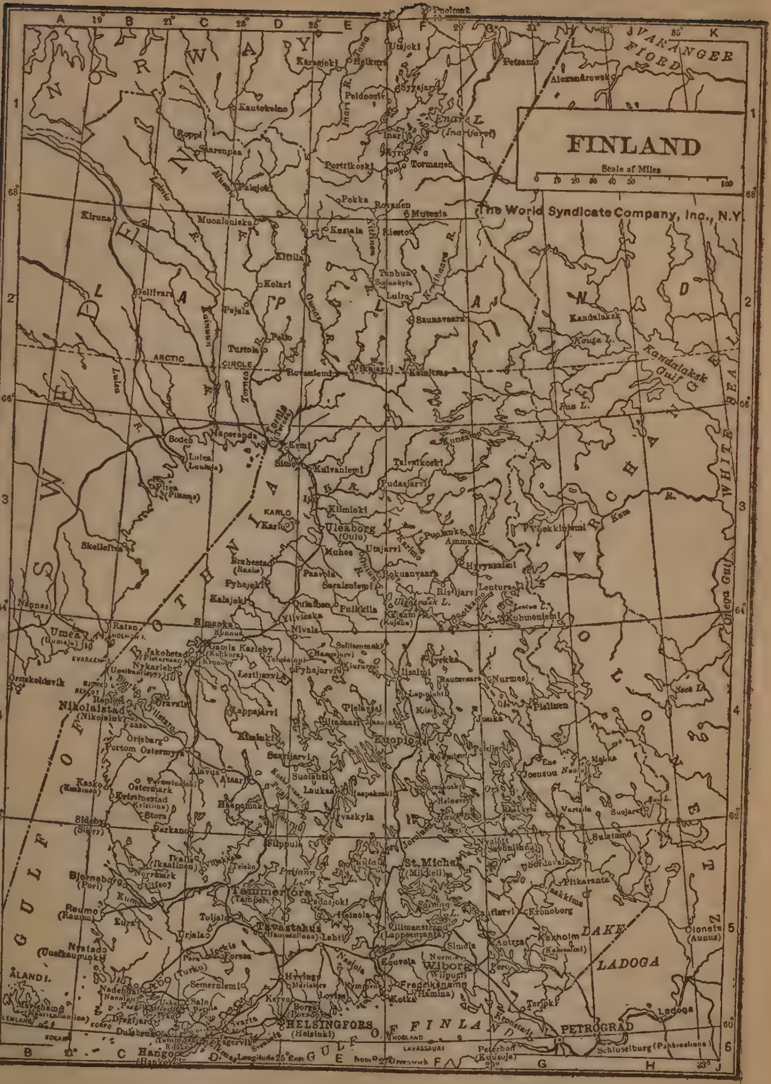
FINISHING, in textile industry, is a purely mechanical process which gives a characteristic appearance to the surface of the material and also affects its 'handle' or feel. Cotton fibres which shrink during bleaching, etc., are stretched on stentering frames while damp, and as they travel over the frame hot air is blown on to them, so that when they reach the end of the frame they are dry and stretched. They can be previously impregnated with starch to stiffen them or with china clay to weight them. By sending stretched cloth over a combination of rollers with or without heat it may be given an ordinary finish, a high gloss, a watered or embossed effect, according to the nature of the rollers. This is *calendering. Beetling* gives a linen-like appearance to cotton by making each thread prominent. Woolen goods are finished by *milling,* which subjects the fabric to mechanical friction to bring about felting or matting by the close interlocking of the hairs in the threads. The surface is subjected to *raising* (*i.e.*), passing over bent spikes which pull up any hairs which have sunk below the surface. By shearing or cropping with an instrument like a lawn-mower the hairs are made of equal length. *Crabbing* prevents the unequal shrinkage of worsted. *Lustering* of silk is effected by stretching it beyond its original length. *Scrooping* gives the silk feel.

FINISTÉRE (*c.* 48° 20′ N., 4° W.), department, W. France; area, 2729 sq. miles; produces flax, cereals, linen; capital, Quimper. Pop. 1921, 762,514.

FINISTERRE (42° 53′ N., 9° 16′ W.), cape, N.W. Spain; off which British twice defeated French in 1747.

FINITE, DIFFERENCES, CALCULUS OF (*Mathematics*).—Deals with the changes in value which arise in functions as a result of *finite* changes in the value of the variables on which the functions depend. It is thus different from the Differential Calculus, which is concerned with the *limits* of the ratios of the increments of mutually dependent quantities as these increments become indefinitely small.

FINLAND, republic, Europe (62° 30′ N., 27° E.), bounded on N. by Norway, W. by Sweden and Gulf of Bothnia, S. by Gulf of Finland; includes large part of Lapland; coast much indented, and many small islands; interior eaten up with large and small lakes—connected naturally or artificially; lake Saima, composed of over 100 large and numberless small lakes, with natural outlet over Imatra Falls (finest in Europe); connected by canal (36 m.) with Gulf of Finland; Lakes Enare, Ulea, Kemi, Payanne; highest mt. (in Lapland), Haldefjall (4,126 ft.); principal rivers, Kemi, Ulea, Kymmene (used for driving mills and floating logs from inland forests, which cover wide expanses belonging largely to state); great extent of swamps. Climate is healthy; severely cold in winter, snow lying from Nov. to April; arctic in Lapland; summer hot and dry. Bears, wolves, and seals are found. Soil is fertile, but mostly pasture-land; chief crops, oats, rye, barley, and potatoes. Wood is utilized for pulp for paper mills; granite of excellent quality is quarried. There are 2,506 m. of railway. Principal towns are Helsingfors (cap.), Abo, Tammerfors, Uleaborg. Important industries comprise iron and mechanical works, textiles, wood industries, paper, dairy produce, leather, chemicals. President elected for six years; National Assembly (200 members) by universal suffrage, for three years. Education well provided for; univ. at


FINLAND
Scale of Miles
0 10 20 30 40 50 100
The World Syndicate Company, Inc., N.Y.
N O R W A Y
S W E D E N
L A P L A N D
A R C H A N G E L
O L O N E T Z
GULF OF BOTHNIA
GULF OF FINLAND
VARANGER FIORD
WHITE SEA
Kandalaksk Gulf
Onega Gulf
LAKE LADOGA
Enare L. (Inarijarvi)
ARCTIC CIRCLE
Tuolmak
Utsjoki
Karasjoki
Helkura
Syysjarvi
Peldoaivi
Petsamo
Alexandrowsk
Kautokeino
Inari
Kyro
Tormanen
Porttikoski
Roppi
Saaronpaa
Palojoki
Pokka
Rovanen
Mutenia
Kiruna
Muonioniska
Kustala
Kittila
Riesto
Kolari
Tanhua
Luiro
Gellivara
Pajala
Saunavaara
Kandalaksk
Kouta L.
Pello
Turtola
Rovaniemi
Vikajarvi
Kemijarvi
Paa L.
Boden
Haparanda
Tornio
Kemi
Lulea (Luulaja)
Simo
Kuivaniemi
Talvikoski
Kuusamo
Pitea (Piitime)
Pudasjarvi
Kiiminki
KARLO
Karlo
Uleaborg (Oulu)
Puolanko
Amma
Vuokkiniemi
Kem
Muhos
Utajarvi
Hyrynsalmi
Skelleftea
Brahestad (Raahe)
Paavola
Rokuanvaara
Pyhajoki
Saraisniemi
Kiantajarvi
Lentura
Kalajoki
Pulkkila
Ulea trask L.
Kajana (Kajaani)
Lentua L.
Kuhmoniemi
Napnas
Ratan
Umea (Uumaja)
Himanka
Ylivieska
Nivala
Sallittenmaki
Jakobstad (Pietarsaari)
Gamla Karleby (Kokkola)
Nykarleby (Uusikaarlepyy)
KVARKEN
Ornskoldsvik
Haapajarvi
Pyhajarvi
Kiuruvesi
Iisalmi
Nurmes
Yrkka
Seg L.
Lestijarvi
Nikolaistad (Nikolainkaupunki)
Oravais
Vaasa
Lappajarvi
Pielavesi
Juuka
Pielisjarvi
Kuopio
Orisberg
Portom
Ostermyra
Kauhava
Saarijarvi
Suolahti
Laukaa
Joensuu
Ene
Kasko (Kaskinen)
Kristinestad (Kristiina)
Ostermark
Alavus
Atsari
Haapamaki
Jyvaskyla
Varkaus
Vartsila
Suojarvi
Sideby (Siipyy)
Stora
Parkano
Keuruu
Suistamo
Nyslott (Savonlinna)
Sordavala
Pitkaranta
Bjorneborg (Pori)
Norrmark
Ikalis (Ikaalinen)
Tammerfors (Tampere)
Padasjoki
St. Michel (Mikkeli)
Saima L.
Raumo (Rauma)
Eura
Toijala
Heinola
Kronoborg
Jaakkima
Nystad (Uusikaupunki)
Urjala
Tavastehus (Hameenlinna)
Lahti
Villmanstrand (Lappeenranta)
Antrea
Kexholm (Kakisalmi)
Olonetz (Aunus)
ALAND I.
Loimaa
Forssa
Hyvinge
Kouvola
Wiborg (Viipuri)
Simola
Mariehamn (Maarianhamina)
Naantali
Abo (Turku)
Semerolemi
Lovisa
Fredrikshamn (Hamina)
Kotka
Terijoki
Ladoga
Salo
Kervo
Borga (Porvoo)
Dragsfjard
Ekenas
HELSINGFORS (Helsinki)
Kronstadt
PETROGRAD
Schlusselburg
Hango (Hanko)
LAVASSAARI
Peterhof
HOGLAND
Longitude 25° East from 27° Greenwich
A B C D E F G H J K
1 2 3 4 5 6
19° 21° 23° 25° 27° 29° 31° 33°
60° 62° 64° 66° 68°

Helsingfors. Most of pop. (Finns, Swedes, Lapps, etc.) are Lutherans. Area, 125,689 sq. m.; pop. 1921, 3,367,542.

History.—Finns came from Volga region; conquered by Swedes in 12th and 13th centuries. Gradual encroachments by Russia led to cession of Finland to Russia (1809); Russian language was made official (1899), and Russian military system enforced (1901). Constitution was reformed (1905), but concessions made were withdrawn and Russian power enforced (1908-11); independence proclaimed during Russian revolution; Bolsheviks defeated by White Guards and Germans, and republic set up; new constitution adopted in 1919.

Language and Literature.—Finnish or Suomi belongs to Ugro-Finnic branch of Uralo-Altaic family; agglutinative, has no articles or prepositions, and in verb no tenses except present and past; many dialects. Literature began with religious subjects, although folk poetry handed down orally is old—(*e.g.*), the epic *Kalevala*, compiled by Lönnrot. There are Finnish newspapers, and translations of Shakespeare, etc. Runeberg, poet and dramatist, stands out as greatest artist.

FINLAND, GULF OF (60° N., 27° E.), shallow arm of Baltic Sea; Lakes Ladoga and Onega drain into it, hence water is but slightly salt.

FINLAY, GEORGE (1799-1875), Brit. historian; entered into Gk. struggle for independence; his history of Greece, first pub. in installments, is the standard authority.

FINLAY, KIRKMAN GEORGE, (1877), Bishop; *b.* in South Carolina. Bachelor of Letters in 1899 of Furman University, and Doctor of Divinity, 1920, University of South Carolina. Deacon and priest of Protestant Episcopal Church, 1902-1907 was missionary in charge Trinity Chapel at Clemson College. At Columbia, South Carolina, from 1907-1921 was rector of Trinity Chapel. Consecrated bishop in 1921 diocese of South Carolina. 1918-1919 in France as Secretary of Y. M. C. A. Trustee of Porter Military Academy, St. Mary's Colored School, Florence Industrial School of South Carolina Director of Rescue Orphanage.

FINLEY, JOHN HUSTON (1863), an American university president and editor; *b.* in Grand Ridge, Ill. He graduated from Knox College, in 1887, was secretary of the State Charities Aid Association, N. Y., during 1889-92, president of Knox College, 1892-9, and president of the College of the City of New York, during 1903-13. He was commissioner of education of the State of New York, from 1913 to 1921, and since the latter year has been an associate editor of the New York Times. Among his books are *The French in the Heart of America*, 1914; and *A Pilgrim in Palestine*, 1918.

FINMARK (70° N., 24′ E.), province on N. coast of Norway, including several islands; capital, Hammerfest. Area, 17,918 sq. miles. Pop. 1920, 43,997. Chiefly fishers and herdsmen.

FINN MAC COOL, FINGAL, Celtic legendary hero, leader of the *fiann* in Ireland; his name occurs in Macpherson's *Poems of Ossian* and in Gaelic ballads.

FINNS. See Finland.

FINS, are organs extending from the bodies of aquatic animals which help them to propel themselves through the water. See Fishes.

FINSBURY, a metropolitan bor. of London, England, bounded S. by the City of London, W. by Holborn, E. by Shoreditch, and N. by Islington. Among the numerous places of interest are the Charterhouse, formerly a Carthusian monastery; Bunhill Fields, the burial-place of Daniel Defoe, John Bunyan, and other eminent persons, and in the near vicinity, many victims of the plague were interred. The principal industry of the borough is watch-making, and working of precious metals; there are also large printing works. Pop. 90,000.

FINSEN, NIELS RYBERG (1860-1904), Dan. physician; discovered curative use of violet and ultra-violet rays in skin diseases.

FINSTERSWALDE (51° 37′ N., 13° 40′ E.), tn. Prussia, Germany; cloth factories, iron foundries. Pop. 15,000.

FIORENZO DI LORENZO (*c.* 1440-1522), Ital. artist; lived at Perugia, where most of his best works are to be seen. These include a *Nativity*, *Adoration of the Shepherds*, and other religious subjects; one of most distinguished painters of the Umbrian school.

FIORENZUOLA (44° 56′ N., 9° 56′ E.), small town, Piacenza, Italy. Pop. 3,500.

FIORD. See Fjord.

FIR, a collective term which comprises two coniferous genera of evergreens, viz. Abies (*e.g.*) *Abies pectinata*, the silver f., and Picea (*e.g.*) *Picea excelsa*, the Norway spruce or spruce f. Both genera include valuable timber trees; whilst resins, balsams, and turpentines are also produced, one species, *Abies balsamea*, yielding Canada balsam, an indispensable reagent for optical and microscopic work. Of the two, Picea is the more hardy, extending throughout Siberia, and found abundantly on the slopes of the Alps, Urals, Rocky Mountains, and other high ranges. The leaves, which are borne spirally on the main axis, are usually tetragonal, but in some species (*P. ajanensis*) they are flattened. The cones, which mature in one year, are shed intact. In Abies the leaf is usually flattened, often with a median groove on the upper surface, and possesses two well-marked resin passages, one in each half of the leaf. The cones are large, and shed their scales, leaving the bare axis on the tree for a time.

FIRBOLGS, legendary Irish race supposed to be Briton invaders.

FIRDAUSI, FERDUSI (940 - 1020 A.D.), Pers. poet; sometimes called 'the Homer of Persia,' and undoubtedly the greatest poet of his country. His real name was Abú-'l Kásim Mansur, and he was *b.* at Shadab (Khurásán). After spending upwards of thirty years in the writing of his great epic, *Shah Nama*, founded on the history of the Pers. kings, spent many of his remaining years in exile at Bagdad, where he composed another famous poem, *Yusuf and Zuleikha*, dealing with the loves of Joseph and Potiphar s wife.

FIRE (O.E. *fyr*), flame or conflagration. According to classical myth., f. was given to mankind by the god Prometheus, who contrived to steal some sparks from the chariot of the sun, which he conveyed to earth hidden in a hollow tube. The raising of f. by means of a concave mirror, or burning-glass, was employed by the Greeks, and is referred to by Aristophanes; and Plutarch speaks of the sacred altar f's being kindled in this manner. Probably the earliest means of raising f. was by rubbing two sticks together, and this method is still found in use amongst primitive races. Such is the method employed in New Zealand and the South Sea Islands. Other simple processes are making a stick rotate rapidly, with the palms of the hands, in a round hole in a block of wood; striking together two pieces of quartz smeared with sulphur, or else friction between a piece of quartz and one of iron pyrites. F.-raising by means of flint, steel, and tinder-box is also of very early origin, and was the general method in Europe and other countries down to the invention of lucifer matches.

F., apart from its usefulness to man, has from very early times been associated with many religious and heathen ceremonies. Fire-walking is a religious ceremony, widespread in all ages and still practiced in Tahiti; priests and other devotees walk barefoot over hot stones, charcoal, or cinders.

FIRE ALARM SYSTEMS. The systems in use at present consist of a form of telegraph signalling equipment, comprising a transmitting device placed in accessible boxes, an underground system of wiring, and a suitable receiving recorder located at the central fire station. The 'fire alarm box' contains a contact-making appliance, generally a wheel, on the circumference of which are a number of projecting pieces. When the wheel is rotated they make and break an electric circuit a certain number of times, which differs for each box on the circuit. A convenient means is provided for turning the wheel. This may be a handle, which when turned, winds a spring acting on the contact wheel or a hook or handle, which when pulled, releases a spring which turns the contact wheel. Various kinds of locking devices are provided for the door. The impulses sent out by the alarm box are recorded by a printing telegraph, supplemented by an audible signal in the central fire station; from here the call is re-transmitted to the fire engine house nearest to the point of origin of the alarm. The system is so arranged that if two calls are made simultaneously from boxes on the same circuit, the calls are transmitted successively, and do not interfere.

FIREBALL. (1) Explosive ball used for illumination or incendiarism; (2) ball lightning.

FIRE BALLOON. See BALLOON.

FIREBRICKS, bricks made from certain *fireclays*, which will withstand high temperature without fusion, used for lining flues and furnaces.

FIRECLAYS are clays which will withstand a high degree of heat without excessive shrinkage or warping. The varieties of F. differ in their degrees of fusibility, owing to the variations in the proportion of free and combined silicon; they are essentially hydrated aluminous silicates with lime and magnesia in the form of carbonates, iron pyrites, free silica, potash, and soda, with a percentage of water. No fixed standard of refractoriness can be given, but in all good F. the fusion point is over 1600° C. Such materials as ganister, sand, sawdust, etc., are mixed up with F. before burning to ensue the 'body' of the brick being sufficiently open in character. Ordinary F. is extensively used for making bricks, crucibles, chimney-pipes, etc., but when special properties are required in the bricks, such materials as lime, bauxite, etc., are added. See Clay Products.

FIREDAMP, the name applied by miners to coal gas or light carbureted hydrogen. It comes from the crevices in the mines, being formed in the coal, and when mixed with the air in a certain proportion is highly explosive, causing many accidents.

FIRE ENGINES. A mechanically operated, mobile pump used to pump water for fire extinguishing purposes. The use of machines of this nature dates back to the Roman and other early civilizations. No description is available of the old Roman machine, but the Egyptians had a crude sort of manually operated two cylinder pump, which delivered the water in a series of impulses or squirts. This intermittent flow was due to the absence of air chambers, which together with hoses made of leather came into use in the 17th century. Paris had fire engines of a sort at the beginning of the 18th century. These were manually operated, and were drawn to the fire by man power. Newsham introduced his English engine, also manually operated, into New York City in 1731. Floating fire engines were in use on the Thames in England at this time (these were the forerunners of the present fireboats). Hand operated fire pumps came into common use after this time; and were superseded only by the advent of the steam engine. In 1850, A. B. Latta of Cincinnati built the first steam fire engine which was dependable and practical. This engine with its steam boiler was mounted on a special truck, drawn by horses, and was used extensively in the larger cities. In 1877 a steam driven, steam propelled engine was proposed, and several were built and used in New York City and Boston. It was not a great success, horses being much more reliable for the purpose. Motor driven engines, with either steam or motor driven pumps are coming into general use at present, and have completely replaced the older steam engines in the larger cities. The modern steam fire engine consists of a boiler with the necessary firebox, flues, apparatus for supplying water to the boiler, etc., mounted on a truck with a steam engine and pump. The boiler is usually of the vertical water tube type, and designed for easy steaming The engine generally of the vertical double acting type, has two cylinders. The pump is also of the vertical, double acting type and is in duplicate. Centrifugal pumps are rarely used. The capacity of the pump varies with the size of the engine, and also with the pressure of the water. The usual range is from 400 to 1300 gallons per minute, or 5000 to 11000 lbs. per hour. The pump draws water from the water main through the 'fire hydrant,' and delivers it to one or more hose lines which are directed into the burning building. Many cities have high pressure water systems which need to be supplemented by a fire engine only when the water is to be used in a very high building. In order that the engine may be ready to pump water immediately upon its arrival at the fire, heaters are installed in the fire house which always keeps the water in the boiler at or near the boiling point; and when the engine leaves the fire house the fire is kindled with oil soaked rags and wood.

FIRE ESCAPES are devices used to enable persons to escape from a burning building when all usual means of exit are cut off by flames or smoke. Self possession and coolness of the persons in danger have much to do with the efficiency of any such safety device. The best type of stationary fire escape is an enclosed or semienclosed stairway on the outside of the building, with suitable landings at each floor. It is essential, of course, that the whole structure be strictly fireproof. In some relatively small dwelling houses, ropes or rope ladders, which have been treated to make them semifireproof, are kept in small boxes under the windows. In case of fire, one end of the rope or ladder is lowered from the window, the other end being permanently fastened to the floor or frame of the house, and the occupants can descend to safety. Hospital and institution buildings frequently employ an enclosed spiral chute, with openings at each floor. The inmates slide down the smooth surface of the spiral. Still another type consists of large portable canvas tubes, carried by some fire companies. These are fastened to the window sill and used as chutes through which persons can make the descent.

FIRE EXTINGUISHER. Burning consists of the chemical combination of substances with the oxygen of the air. To bring about this combination, or combustion, a certain temperature must be reached. Fire may, therefore, be extinguished either by reducing the temperature below the point necessary for combustion or by preventing access to the fire of atmospheric oxygen. Water poured on to a fire cools the burning substances and also produces steam which forms a blanket which prevents, or hinders, access of air. The quantity of water required, however, is considerable, and in consequence various chemical extinguishers are used which smother the fire by producing a gas which will not support combustion. One of the earliest devices, and one which is still in common use, consists of a metal container in which are placed a bottle of acid, and the solution of a carbonate—usually, bicarbonate of soda. By reversing the container, or in some other manner, the bottle of acid is broken, mixes with the solution, and causes the evolution of carbonic acid gas, which is carried by a stream of water to the fire. A recent modification is the admixture, with the solution, of some substance (liquorice root is sometimes used) which will produce a heavy foam. In this way the fire is covered with a blanket of bubbles filled with carbonic acid gas. Other extinguishers in common use are filled with carbon tetrachloride which, when heated, evolves heavy vapors which choke the fire.

FIRE-FLIES. See POLYMORPHA.

FIRE INSURANCE. See INSURANCE.

FIRE PREVENTION. The number of fires occurring annually in the United States averages over four hundred thousand, involving a loss of more than five thousand lives. The cost of these fires, including actual loss, and the cost of protection and insurance, but not including loss of business, amounts to $7 per head of the population, or a total of nearly eight hundred million dollars. Fires occur annually in approximately 2% of the total number of buildings, and the number of fires in the cities is from five to ten times the number occurring in the cities of Europe. The question of fire prevention, therefore, is one of immense importance, and has received careful attention and study from the United States Bureau of Standards.

Such an investigation necessarily begins with the study of the origin of fires. A review of 190,000 fires which occurred during the years 1909-1915 showed that 22% arose from unknown causes, 8% were due to faulty or neglected chimneys, 8% to carelessness with matches, 6% to adjoining fires and the remaining 56% to a great variety of causes including lightning, bonfires, carelessness with cigarettes, faulty heating equipment, spontaneous combustion, incendiarism, and accidents with kerosene, gasoline and other inflammable liquids. It will be seen that the causes of fires may be roughly divided under three headings, accidents beyond the control of the individual, personal carelessness and faulty construction. In this article the methods of prevention will be considered under those headings.

1. Prevention of fires due to accidents. It may seem something of a contradiction to speak of preventing fires due to accidents beyond the control of the individual, and fires do occur every year which could not have been prevented by any reasonable precautions. Nevertheless, while it is often impossible to *prevent* an accident, it is always possible to be *prepared* for it. Lightning, for instance, is beyond the control of man, but scientifically placed lightning conductors and fireproof construction will go far to minimize the danger of fire from that cause. Spontaneous combustion is usually preventable, but even when it is not, a little ordinary care will avoid serious consequences. Oily or greasy rags, especially those which have been used for furniture polish or floor oil, will frequently begin to burn spontaneously, and there is no known means of preventing this. If, however, the rags are kept in a closed metal container, they can only smoulder and the danger of fire will be eliminated. Newly mown hay has caused the destruction of many barns by spontaneous combustion, but this can clearly be avoided by waiting until the hay is cured before storing, or by providing sufficient ventilation to carry away the heat produced. The spreading of a fire from adjoining conflagrations is frequently unavoidable, but the use of fireproof materials for roof construction is a sensible precaution. Many fires have been spread by firebrands alighting on a wooden shingle roof. The use of safety matches will reduce to a minimum danger of fire from this cause.

2. Prevention of fires due to personal carelessness. Under this heading are considered those causes of conflagrations which in the strictest sense of the word are avoidable. Matches are a fruitful cause of fires, but it is usually the careless or ignorant use of the match, rather than any dangerous quality in the match itself, which produces the trouble. Burning or glowing matches are thrown into waste-paper baskets or on the floor. Matches are kept in places accessible to children. The match-box is kept open while the match is struck. Prevention of fires from such causes is obvious and easy. Matches should never be thrown away until they have ceased to glow; they should be kept out of reach of children, preferably in metal containers; they should be used with care and good sense. The careless handling of cigarettes, cigars and even pipes is among the common causes of fires, and here, again, ordinary precaution is all that is necessary for safety. To the fire departments of our cities 'every smoker is a fire hazard,' and in most factories and many places of business smoking is prohibited. In barns, garages, and in other places where the hazard is very evident, even the most careful smoker should refrain from smoking, altogether. Again, wax candles, whose use in these days of electric and gas lighting is almost inexcusable, are a frequent cause of fires. Especially is this the case when they are used for Christmas tree decorations, and every year fires and sometimes deaths arise from this cause. Carelessness can be displayed in the use of modern inventions, however, as well as of those which are now superseded. Portable electric devices, especially electric irons are among the well-recognized fire hazards. The current unintentionally left on in an electric iron may easily overheat the iron and ignite woodwork in the vicinity. Kerosene, naphtha, gasoline and similar liquids cause countless fires every year. Kerosene should never be used for lighting a fire; it may cause an explosion. Gasoline or naphtha should be used for cleaning, if at all, out-of-doors. Lamps should never be filled while they are alight. Discarded gasoline should be thrown outside on the ground, and never poured down drains or sinks, and containers filled with gasoline should never be kept in the house.

3. *Prevention of fires due to faulty construction.* The first precaution against fire in the construction of a house is to see that the heating equipment is correctly installed and that steam, water, gas and hot-air pipes are properly located. Also that stovepipes, flues, and chimneys are clean and in good condition, and sufficiently insulated from woodwork. If possible, the heating equipment should be isolated, and so arranged that any fire originating in the vicinity of the furnace could be easily cut off from the remainder of the building. Electric wiring should be properly installed and carefully inspected, so as to minimize dangers from short circuits, defective wiring or improper switches. Equal care should be exercised in the installation of gas piping and fixtures, every possible precaution being taken to avoid leaks. Continuous air spaces under floors and in walls should be avoided. Roofs and preferably walls and floors, should be of fireproof material.

FIRELESS COOKER. The fireless cooker, in its simplest form, consists of a box with a space in the middle to accommodate a saucepan, or other utensil, the area between this space and the walls of the box being filled with some heat insulating material such as asbestos, hay, wool, sawdust or paper. The food in the utensil is heated to the boiling point and is then placed in the box, the lid of which is tightly closed. Owing to the fact that the utensil is surrounded by insulating material, heat loss due to radiation is very slight, the food remains hot for a long time and slowly cooks. In the more elaborate forms of fireless cookers the same principle of heat insulation is used, but it is customary also to employ one or more heated slabs, usually made of soapstone, which are placed above or below the cooking utensil, and so supply additional heat. The chief argument in favor of the fireless cooker is its economy. When cooking over a gas or coal range, there is much loss of heat due to radiation. The fireless cooker reduces this loss to a minimum, so that the only heat needed is that used in raising the food and the soapstone slabs to the required temperature. The cooking of the food is also slower, and therefore more even and thorough, which is an advantage in some cases.

FIRELESS ENGINES. This term is applied to any steam or vapor engine which derives its power from some sort of storage system, which is recharged or regenerated at intervals by special or auxiliary apparatus. As the name implies, the engine is entirely detached from any heating apparatus, and therefore carries no fuel. Such an engine was designed and used with moderate success for propelling street cars in New Orleans in 1870 by Dr. Emile Lamm. He utilized the expansion of compressed ammonia in a machine resembling a reciprocating steam engine. The exhaust pipe led to a tank of water; the tendency of ammonia to dissolve in water is so great that a partial vacuum is formed under these conditions, thus increasing the total pressure at which the engine operated, making it reasonably efficient. Steam locomotives have been built in which the boiler and fire-box were replaced by an insulated tank which was charged or filled with superheated water. When the throttle was opened, the water expanded into steam, and ran the engine. This type of engine was never economical, and has been replaced by compressed air and electric traction.

FIRENZE, Ital. name for Florence (*q.v.*).

FIRENZUOLA, AGNOLO (*c.* 1493-1544), Ital. poet and man of letters; works distinguished by satirical qualities, licentiousness, and elegant style.

FIREPROOFING, process of covering or impregnating wood, textiles, paper and other combustible materials, so that they may be able partially or wholly to resist fire. The substances and solutions used for this purpose commonly form a crust of non-inflammable material that, while it retards or thwarts the flames, does not prevent internal decomposition. Some of the chemicals employed give off gases under the influence of heat in the presence of which combustion cannot proceed. Certain saline solutions, such as ammonium chloride, ammonium phosphate, borax, alum, aluminium hydroxide, calcium chloride, sodium tungstate and zinc sulphate, are most commonly used for fireproofing. The canvas used in theater curtains and stage scenery is steeped in some such solution. Paper is sometimes made both fireproof and weather proof by having asbestos and salts, such as alum and borax, mixed with the vegetable pulp of which it is made. In the case of wood the solution has to be forced in under pressure. Timber is usually treated with ammonium salts, such as sulphate and phosphate and ferric and aluminium sulphates. Fireproof paints are those in which sodium silicate and zinc chloride have been incorporated. Whitewash, with an infusion of silicate of soda, and heavily applied has a marked fire-resistant value.

FIRESHIP, vessel filled with combustibles or explosives, fired and set adrift against hostile fleet; used by Drake against Span. Armada.

FIRESTONE, HARVEY SAMUEL (1868), American Manufacturer; *b.* in Ohio. Had High School and business college education. 1896-1900 was president Victor Rubber Company. In 1900 organized Firestone Tire and Rubber Company at Akron, Ohio. President of Firestone Steel Products Company, Firestone Tire and Rubber Company, Limited, of Canada, Firestone Tire and Rubber Company of United States of America. Central Savings and Trust Company, Ohio. Member during World War of National Defense, Ohio council. Helped to organize rubber division of War Industries Board. Member of Rubber Association of America. Highway and Highway Transport Education Commission. 1921-1922 was vice president Ohio Federation of Churches. To student of High School, who writes best essay on highway transportation and good roads, he donates scholarship yearly for four years college education and expenses. Member of Akron Chamber of Commerce and Akron Real Estate Board.

FIREWORKS, products of the art of *pyrotechny* (*i.e.*), the making of scenic effects by fire and chemical compounds. Pyrotechny is of very ancient origin. f's of a kind being known in China for many ages, while displays were given in Rom. circuses from an early date. Gunpowder, however, practically revolutionized the art and researches of chemists, and scientists have rendered the making of modern f's a fine art. The burning of certain minerals, mixed in definite proportions, gives different colored effects, and upon this fact the variations in f's may be said to lie. The minerals generally used, and the color effects they produce are as follows: barium—green; calcium—red; copper—green or blue; lithium carbonate—purple-red; salts of strontium—crimson; sodium—yellow; sulphide of antimony—white; sulphide of arsenic—white.

Charcoal and sulphur are greatly used, too, and mixed with a proportion of nitre form gunpowder. After the compounds have been mixed they are packed in cylindrical cases, generally made of pasteboard, and the cases are made with mathematical precision, for much depends on their size and shape.

Amongst simple f's are crackers, squibs, Roman candles, stars, sparks, maroons, Bengal lights, jack-in-the-boxes, colored fire, etc., whilst the more complicated are rockets, bombs, rotating or Catherine wheels, and set pieces (battles or portraits.)

FIRE WORSHIP. See Zoroastrians

FIRKIN, old measure of capacity, small cask.

FIRMÂN, Turk. passport; also name given to edicts issued by Sultan or his officials.

FIRMINY (45° 23′ N., 4° 20′ E.), town, Loire, France; coal mines; steel and glass works. Pop. 17,000.

FIROZABAD (28° 45′ N., 52° 35′ E.), town, Fars, Persia; grain and rice.

FIROZPUR (30° 57′ N., 74° 38′ E.), district, Punjab, India; area, 4300 sq. miles. Pop. 1,000,000; its capital, Firozpur, pop. 50,000, contains arsenal.

FIRTH, CHARLES HARDING (1857) Eng. historian; Regius prof. of modern history in univ. of Oxford (1904); has written largely on the period of the Civil War and the Commonwealth; ed. *Naval Songs and Ballads*, 1907.

FISCHER, EMIL (1852-1919), Ger. chemist; prof. of chem. in Berlin; won Nobel prize for chem. (1902); has prepared ozazones, rosaniline dye-stuffs, and compounds of uric acid; but his greatest work is the synthesis of the simplest proteins from amido-acids.

While synthesizing carbohydrates he investigated many of their properties and the action of ferments.

FISCHER, ERNST KUNO BERTHOLD (1824-1907), Ger. philosopher of Hegelian school; prof. at Jena.

FISH CULTURE or **PISCICULTURE**, the artificial hatching and rearing of fish. Artificial propagation of fish is facilitated by the fact that the eggs are fertilized by the male after being deposited by the female, and was practiced in China at least two thousand years ago. The roe is taken from the female by gentle squeezing, then mixed with the milt taken from the male, after which it is allowed to incubate in tanks of gently running water. After being spawned, the fry may be grown in tanks to a size large enough to guard themselves against the dangers of their natural surroundings. They may then be transported to distant points to restock waters which have been depleted of certain species. This function was first undertaken by the Government in 1871, through the U.S. Commission of Fish and Fisheries. Since then the Commission has established fish hatcheries in 33 states, not including Alaska and the District of Columbia. In 1921 the number of fish raised called 'fingerlings', so called on account of their size, was over 226,000,000, while the smaller fry aggregated over three-and-a-half-billion, covering 37 species and varieties of fish. One feature of this service is the supply of a mosquito-eating fish, the gambusia, to districts where the malarial mosquito abounds. At the call of the Red Cross, shipments of these fish were made to Spain and Italy.

FISH, HAMILTON (1808-1893), an American statesman; *b.* in New York. He graduated from Columbia University, in 1827, began practicing law in 1830 and in 1842 was elected to Congress as a Whig. In 1847 he was lieutenant-governor of New York, and governor in the following year. In 1851 he became a U.S. Senator. He was one of the founders of the Republican Party shortly after. During the Civil War he was chairman of the Union Defense Committee in New York, later during the war period being a member of the commission for the exchange of prisoners. From 1869 to 1877 he was Secretary of State in President Grant's Cabinet, as such being responsible for a number of important negotiations entered into with foreign countries during this period.

FISH, NICHOLAS (1758-1833), an American Revolutionary soldier; *b.* in New York. He first distinguished himself at the Battle of Saratoga, in 1777, later, at the Battle of Monmouth, having command of a corps. From 1784 till 1793 he was Adjutant-general of New York, and during 1806-17 he was an alderman of New York City.

FISH, STUYVESANT (1851-1923), Railway Official, Banker; *b.* in New York. Graduate of Columbia College. Was clerk and secretary to president of Illinois Central Railroad. In 1877 was director of Illinois Central Railroad. From 1882-1884 vice president of Chicago, St. Louis and New Orleans Railroad. President from 1887-1906 of Illinois Central Railroad. Trustee of New York Life Insurance and Trust Company. Was director of National Park Bank, In 1905 was chairman 7th International Railway Congress at Washington.

FISHER, RT. HON. ANDREW (1862) Australian statesman; *b.* Kilmarnock, Scotland; emigrated (1885); Labor member of Queensland Parliament (1893); minister of railways; elected to Commonwealth Parliament (1900); minister of trade and customs (1904); leader of his party (1907), premier three times (1908-9, 1910, 1914-15); P.C. (1911) was appointed High Commissioner for Australia with residence in London (1915).

FISHER, DOROTHY CANFIELD (DOROTHEA FRANCES CANFIELD FISHER) (1879), an American author; *b.* in Lawrence, Kans. She graduated from the Ohio State University, in 1899, was for three years secretary of the Horace Mann School, then traveled extensively in Europe. Among her books are *Mothers and Children*, 1914; *Fellow-Captains*, 1916; *Home Fires in France*, 1918; and *The Brimming Cup*, 1921.

FISHER, GEORGE PARK (1827-1909), an American theologian and historian; *b.* in Wrentham, Mass. Graduating from Brown University, in 1847, he was later professor of ecclesiastical history at Yale University, being professor emeritus after 1901. Among his numerous works are *Essays on the Supernatural Origin of Christianity*, 1865; *History of the Reformation*, 1873; *Manual of Christian Evidences*, 1890; *A Colonial History of the United States*, 1892; and *A History of Christian Doctrine*, 1896.

FISHER, HARRISON (1877), an American artist and illustrator; *b.* in Brooklyn, N. Y. He was educated in the public schools of San Francisco and has traveled extensively abroad. His illustrations have appeared in many books, and in such periodicals as The Saturday Evening Post, Scribner's Magazine, The Ladies Home Journal, Life, Puck and the Cosmopolitan Magazine. In 1922 he was specially employed by the latter publication. He has also painted portraits.

FISHER, HERBERT ALBERT LAURENS (1865), English statesman and historian; president of the Board of Education since 1916; formerly vice-chancellor of Sheffield Univ.; author of *A Political History of England*, 1906; *The Republican Tradition in Europe*, 1911, etc.; introduced and carried the Education Act of 1918, a remarkable development of national education, also an improved pensions scale for teachers, and numerous other reforms; F.R.S. 1920.

FISHER, H. C., ('BUD') (1884) Cartoonist; *b.* in Illinois. Educated at Hyde Park High School and attended University of Chicago, but is not a graduate. In 1905 began as cartoonist in San Francisco. Created *Mutt and Jeff.* Was first Cartoonist to syndicate own work. Has contract with Motion Picture Producers to produce work in moving pictures. Appears in vaudeville. Author of five books of *Mutt and Jeff* from 1910-1916. 1917 Lieutenant of Field Artillery in National Army.

FISHER, IRVING (1867), an American economist; *b.* in Saugerties, N. Y. He graduated from Yale University, in 1888, then studied in Paris and Berlin. Since 1898 he has been professor of political economy at Yale University. Among his many books are *Mathematical Investigations in the Theory of Value and Prices*, 1892; *The Rate of Interest*, 1907; *Why is the Dollar Shrinking*, 1914; and *Stabilizing the Dollar*, 1919.

FISHER, JOHN (*c.* 1469-1535), Eng. Churchman; bp. of Rochester; advocated reasonable reform in Eng. Church, but opposed Lutheranism; opposed Henry VIII.'s divorce, and was executed for his denial of king's ecclesiastical supremacy; canonized in 1886.

FISHER OF KILVERSTONE, JOHN ARBUTHNOT, 1ST BARON (1841-1920), admiral of the fleet; commanded *Inflexible* at Alexandria (1882); lord of the Admiralty (1892-7); commander-in-chief on N. Amer. and West Indies station (1897-9); commander-in-chief Mediterranean station (1899-1902); second sea lord (1902-3); first sea lord (1904-10 and 1914-15), resigning in 1915 on the question of the Dardanelles expedition; initiated the Dreadnought (all big-gun ship) policy, and thereby created a revolution in naval shipbuilding; O.M. (1905); peerage (1909). Has published the highly fulminatory works *Memories*, 1919 and *Records*, 1919.

FISHER, LEWIS BEALS (1859), American College President; *b.* in Maine. Educated at St. Lawrence University and Canton Theological Seminary. Doctor of Divinity of St. Lawrence University. Ordained Universalist Minister 1881. Pastor from 1882-1886 at Rochester, New York and Bridgeport, Connecticut, 1886-1891. Professor at Canton Theological Seminary of Pastoral theology and sociology from 1891-1905. Was president of Lombard College and Ryder Divinity School. Dean since 1911 Ryder Divinity School. Associated with Chicago University. Author of *Prayers for the Home*, 1890; *History of the Universalist Church*, 1897; *The Story of a Down East Plantation*, 1915.

FISHER, WALTER L. (1862), ex-Secretary of the Interior; *b.* in West Virginia. Educated at Marietta College, and Doctor of Laws of Hanover College. 1888-1911 practiced as lawyer in Chicago. From 1911-1913 was Secretary of the Interior in President Taft's Cabinet. In Chicago 1888-1889 was special assessment attorney. 1906-1911 was special counsel for Chicago in railway terminal and other matters. 1908 - 1909 president Conservation League of America. Was director of Chicago Bureau of Public Efficiency. Member of Chicago Railway Terminal Commission, Railway Securities Commission. Trustee of Chicago Historical Society and Gilpin Fund. From 1910-1911 was vice president of National Conservation Association. Was vice president of National Municipal League.

FISHER'S HILL, in Virginia, twenty miles south of Winchester and about two miles south of Strasburg, between Massanutten and the North Mountains, on a branch of the Shenandoah River. It is noted as the scene of the battle between the Confederates under General Early and the Union forces under Sheridan, fought on September 22, 1864, which resulted in the complete rout of the Confederate forces, the Union losses being about 500 and those of the Confederates 240 in killed and wounded and 995 missing.

FISHERIES, the water areas where fish propagate, either naturally or by cultivation, or where they travel or congregate at seasonal periods, or coast, lake and river localities where fishing industries are established. The United States (including Alaska) and Great Britain are the leading fishing countries of the world. The American production of fish aggregates some 2,500,000,000 pounds valued at about $80,000,000. Great Britain's yield in 1921 was 1,834,000,000 pounds valued at $104,800,000. Spain and Canada also rank close as fish producers. The former country in 1920 caught 889,763,000 pounds, valued at $72,197,000; the latter had a catch in the same year of 851,293,000 pounds, worth $49,241,000. France's fisheries in 1919 had a production worth $84,725,000. Other important fishing countries are Holland, Sweden, Germany, Denmark and Norway.

The American fish industry employed in 1921 about 192,000 persons, 7,400 vessels and 77,000 boats, and had a capital invested in it of $173,000,000. The principal fish states are Massachusetts, Maine, North Carolina, Florida, and California. Oysters mostly come from the extensive fishing beds along the Atlantic coast, notably on Long Island Sound, Delaware and Chesapeake Bay. The Pacific slope produces salmon and has great canneries, especially on the Columbia river. Cod is the chief product of the New England fisheries, part of the catch coming from the Grand Banks and other areas off Newfoundland and Nova Scotia. Sea-herring, lobsters, clams and oysters lead as products of New England's coast fisheries, especially in Maine. The Middle Atlantic States, in addition to oysters, produce bluefish, manhaden, sea bass, squeteague, hard clams, crabs, shad, alewives and striped bass. Shad is the outstanding catch of the South Atlantic States, and mullet, squeteague, oysters, shrimp and sponges chiefly occupy the industry in the Gulf states. The Pacific coast has a large output of herrings and oysters, as well as salmon.

The Great Lakes contain a number of great fisheries, Lake Michigan leading in production. The species caught on the lakes are white fish, lake herring, lake trout, pike, perch and yellow perch. In the interior the Mississippi and its tributaries furnish a plentiful supply of black bass, buffalo fish, carp, crappies, suckers, frogs and mussels.

Outside the United States, seals are caught in great quantities off Newfoundland. Canada's chief fish product is salmon. Herring is the biggest catch in British waters. Russia has vast fishery resources in fresh water, especially on the Caspian Sea and the Ural and Volga rivers, the principal yield being herring, sturgeon (for caviere) and roach. France's fish industry is largely augmented by French fishermen in Newfoundland, Iceland and the North Sea, where they make catches of great magnitude, chiefly cod, herring and mackerel. The French coast fisheries specialize in the canning of sardines. Italy has many fishermen who obtain coral and sponges. Greece and Turkey also have important sponge fisheries. The chief fish products of the North European countries are cod and herring. Sealing and whaling are pursued along the northern coasts of Norway and in the Arctic. Germany's fisheries are in the North Sea, where herring, cod and mackerel yield the greatest catch. The Dogger Bank provides a productive deep-sea area for cod and ling. Spain and Portugal have valuable fisheries for sardines and tunny, which are preserved in salt and oil.

FISHES, class—*Pisces*, form a great class near the base of the vertebrate stock. They are most closely related to the Amphibians, with which they are associated in the group *Ichthyopsida*, but from these, as from other vertebrates they can be easily distinguished, owing mainly to characters impressed upon them by their aquatic life. The study of fishes, from whatever point of view, is known as *Ichthyology* (Gk. *ichthus*, a fish).

The majority of fishes are spindle-shaped, with head, trunk, and tail graduated into each other, so that the minimum of resistance is offered to their passage through water; but there are also 'flat'-fishes, 'globe'-fishes, 'ribbon'-fishes, and others, the habits of which have led them to depart from the typical form. For swimming purposes their bodies are very muscular, the muscles lying in flakes—segments or myotomes—and actuating the swimming organs, or fins, the paired sets of which probably represent the limbs of other vertebrates. The exterior of the body is generally protected by scales of various forms and types.

Their senses are similar to those of higher animals. Hearing and taste are feebly developed, but smell, associated with the nostrils and even, it has recently been discovered, with the dorsal vibratile fin in the Rockling, is acute. Tactile organs, barbels, elongated fin-rays, and perhaps the lateral line are highly developed, especially in abyssal fishes, where they compensate for the reduction or absence of eyes. But in most there are efficient eyes, sometimes stalked, rarely, as in Anableps, with both an upward and a downward-looking segment.

Their food consists of many shore forms of seaweed, or of organic matter abstracted from mud, but most pelagic fishes are carnivorous, feeding on minute crustacea, jelly-fishes, worms, molluscs, etc., or on fishes smaller than themselves. According to their habit they are furnished with flat crushing, or sharp biting teeth.

All fishes breathe the air dissolved in the water which washes their gills. Here foul blood, driven by the two-chambered heart, is purified and returns to the head and body. An accessory to respiration is the air-bladder, which in the Dipnoi has lung-like functions and drives pure blood to the incipiently three-chambered heart, where it mixes with the impure body blood.

Some fishes, a few Bony Fishes and Sharks, bring forth living young, but, as a rule, the Eggs are fertilized and hatch externally. Sometimes they are laid in sand or gravel, the male afterwards depositing spermatozoa, or 'milt,' upon them, or are attached to water-weeds; but the great majority of marine fishes lay enormous numbers of floating eggs. It has been calculated, for example, that in a single season a female cod will produce on an average 4,398,700 eggs. The ovary of a female fish is eaten under the name of *roe*; and from the salted roes of sturgeon *caviare* is made. Amongst Elasmobranchs the large eggs are protected in a horny capsule—the 'mermaid's purse.' The eggs once laid and fertilized, most fishes leave their further development to chance, but the males of several species (notably the Sticklebacks) build nests for their protection and guard them faithfully, or, as in the Pipe-Fishes, retain them temporarily in an external pouch. *Spawning* habits afford many points of interest.

FISHERIES LAW. Fishery legislation is both local and international, and has two aims, that of protecting the fishermen and that of protecting the fish. The preservation of trout and salmon in rivers is enforced by regulations dealing with property rights, with restrictions as to the means by which the fishes may be caught—for example, by exclusion of weirs and nets, and by institution of periods (close terms) during which fishing for a particular species is illegal.

In the sea, fisheries are protected by international law. Territorial Waters are the littoral sea, or inland gulfs, which can be occupied by the sovereign of the land. Three miles from the shore and six miles from the entrance to bays or gulfs is the minimum territorial limit. Within this area the use of trawl-nets is prohibited, and many fish nurseries are thus safeguarded. Further efforts are made to preserve immature individuals of edible fishes by regulating the size of meshes of nets and by prohibiting the sale of fishes under a given size.

FISK, CLINTON BOWEN (1828-1890), an American politician; *b.* in Griegsville, N.Y. As a child he accompanied his parents to Michigan, where he went into business and acquired considerable means as a merchant. During the Civil War he served the Union as a soldier, with the rank of brigadier-general, later being assistant commissioner of the Freedman's Bureau for Kentucky and Tennessee, with headquarters in Nashville. It was in this capacity that he became interested in the Negroes, to such a degree that he founded the Fisk University, in Nashville, Tenn., an institution for Negro boys and girls. Later he became interested in politics and as Prohibition candidate in the elections of 1888 polled over 250,000 votes.

FISK, EUGENE LYMAN (1867), physician; *b.* in Brooklyn, New York. Graduate in 1888 of New York University. In 1890 became connected with Equitable Life Assurance Society of United States, in Medical department. Until 1898 was in charge of Western departments of same. 1898-1910 medical director Provident Savings Life Association. 1910-1913 Medical director of Postal Life Insurance Company. Since 1913 vice president of Life Extension Institute. Was member of National Institute Social Sciences. Author of *Alcohol—Its Relation to Human Efficiency and Longevity*, 1916; *Food-Fuel for the Human Engine*, 1916; in 1918 (with Professor Irving Fisher) *Health for the Soldier and Sailor*. Writes for magazines on personal hygiene and prolongation of life.

FISKE, BRADLEY ALLEN (1854), an American naval officer and inventor; *b.* in Lyons, N.Y. He graduated from the U.S. Naval Academy at Annapolis, in 1874, saw active service in the Philippines during the Spanish-American War and was promoted to the rank of rear-admiral in 1911. In 1915 he resigned from the service. He is the inventor of a great number of naval appliances, among these being a boat-detaching apparatus, a system of electrical communications inside battleships, an electrical range finder, a system of turning turrets of warships by electricity, and a naval telescope sight, the latter now in use in all navies.

FISKE, HARRISON GREY (1861), theatrical manager; *b.* at Harrison, New York. Attended New York University for two years. Was dramatic critic and editor of several newspapers, and writes for various magazines. Author and adapter of many plays. Was manager of various dramatic organizations.

FISKE, JOHN (1842-1901), philosopher and historian. His name originally was Edmund Fiske Greene but he adopted the name of a maternal great-grandfather on his mother's second marriage. He graduated from Harvard in 1863, Harvard Law School, 1865 and joined the bar, but never practiced. In 1869-1879 and in 1896-1897 he lectured at Harvard on philosophy. In 1884 he was non-resident professor of American History at Washington College, St. Louis, Mo. and lectured at University College, London in 1880, and the Royal Institution. First became known as a writer on evolutionary philosophy, and interpreter of Herbert Spencer. After 1879 American history became his chief study, and science secondary. His *Ideal of God* and *Origin of Evil* express his ideas on philosophy and religion. A great worker, he produced many books, notable are *Myths and Myth Makers*, 1872; *The Unseen World*, 1876; *The Destiny of Man*, 1884; *American Political Ideas*, 1885; *How the U. S. Became a Nation, The War of Independence*, 1889; *The American Revolution*, 1891; *A Century of Science*, 1899; *Essays Literary and Historical*, 1902; *Unpublished Orations*, 1909. He edited *Appleton's Cyclopedia of American Biography*, 1887-1889.

FISKE, MINNIE MADDERN (1865), an American actress; *b.* in New Orleans, La. Being the daughter of a theatrical manager, she appeared in child parts at the age of three, and at the age of twelve was alternately playing leading roles and old-women parts. At fifteen she began starring, under the name of Minnie Maddern. She is especially identified with the parts of Tess in *Tess of the D' Ubervilles*, and Becky Sharp in the play of the same name. Among her more recent successes are *Miss Nellie of N'Orleans*, and *Madam Sand*.

FISK UNIVERSITY, a co-educational institution for Negroes, founded in Nashville, Tenn., in 1866. During the term 1921-22 it had a student enrollment of 472 and a faculty of 63. It has a library of 12,000 volumes and an endowment of over $250,000.

FISMES, an arrondissement, or district, of Rheims, in the Department of the Marne, on the Vesle River, rendered famous during the World War as the center of much heavy fighting between the French and German armies, especially in May, 1918, when the Germans made their big, final drive which resulted in the salient from Soissons to Rheims. This advance continued until first checked by the American forces under General Pershing at Chateau Thierry. Fismes was recovered from the Germans on August 1, 1918.

FISTULA (*a*) abnormal opening from the surface of the body into a normal canal or organ; or (*b*) an abnormal opening from one normal canal or cavity in the body to another, *e.g.* (*a*) anal fistula (*b*) rectovesical fistula, between rectum and urinary bladder.

FITCH, ALBERT PARKER (1877), educator; *b.* in Boston. In 1900 was Bachelor of Arts at Harvard College, 1903 Bachelor of Divinity at Union Theological Seminary, 1909 was Doctor of Divinity at Amherst College and 1914 at Williams College. In 1903 ordained Congregational minister. From 1903-1905 pastor of first church, Flushing, Long Island, and 1905-1909 at Mount Vernon church in Boston. At Andover Theological Seminary, was president from 1909-1917. Since 1917 at Amherst College was professor of history of religion. 1919-1920 was Beecher Lecturer at Yale University. Member of academy Political Science, of National Institute of Social Sciences, and honorary member of Harvard Chapter, Phi Beta Kappa. Author of *Can the Church Survive in the Changing Order?*; *The College Course and the Preparation for Life*; *Preaching and Paganism*; *Religion and the Undergraduate.*

FITCH, JOHN (1743-1798), an American inventor; *b.* in East Windsor, Conn. During the Revolutionary War he was an armorer with Washington's forces, but he deserves special recognition because of the fact that he was the inventor of the steamboat. His first attempt to propel a vessel by steam-driven motive power was made in 1786, which was not a success, but in the following year he constructed a vessel which was fitted with paddle wheels driven by a steam engine, which sailed successfully on the Delaware River, carrying passengers and freight for over two years. The ultimate failure of his invention was due to lack of financial support, rather than any mechanical shortcomings.

FITCH, WILLIAM CLYDE (1865-1909), an American playwright; *b.* in New York. He graduated from Amherst College in 1886 and immediately began writing, his first success being *Beau Brummel*, which was brought out in 1890 with Richard Mansfield in the leading part. Though not rated as a great playwright, Mr. Fitch was the first distinctively American writer of American plays and acquired a wide popularity. Among his other productions are *The Climbers,* 1905; *The Straight Road,* 1906; and *The City,* 1909. He also wrote a novel, *A Wave of Life.*

FITCHBURG, a city of Massachusetts, in Worcester co., of which it is one of the county seats. It is on the New York, New Haven and Hartford Railroads, 50 miles northwest of Boston. Within it are included five villages. The city has important manufactures, including the making of pianos, tools, machinery, paper, saws, electrical apparatus, steam engines, bicycles, firearms, cotton and woolen goods, etc. There is a public library, and a high school. Electric railways connect it with neighboring towns and cities. Pop. 1920, 41,013.

FITTON, MARY (fl. 1600), *dau.* of Sir Ed. Fitton, of Gawsworth, Cheshire; Queen Elizabeth's maid of honor; Earl of Pembroke's mistress; the supposed 'dark lady' of Shakespeare's sonnets.

FITZGERALD, a city of Georgia, the county seat of Ben Hill co. It is on the Seaboard Air Line, the Atlanta, Birmingham and Atlantic, and other railways. It has important industries including the manufacture of cotton and oil, fertilizers, and repair shops. It is the center of an important timber and turpentine region. Pop. 1920, 6,870.

FITZGERALD, family name of Dukes of Leinster, and of former Earls of Desmond, latter title being extinct since 1601, when the last earl (restored 1600, seventeen years after his *f.'s* attainder and execution for rebellion) died unmarried. Both families trace descent from Dominus Otho, a Florentine noble, who came to England before Norman Conquest and whose *s.*, Walter was castellan of Windsor in Domesda times. John F. was cr. Earl of Kildare, in 1316, title descending in family until James, 20th earl, was Duke of Leinster in 1766.

FITZGERALD, EDWARD (1809-83), poet, went to Trinity College, Cambridge, in 1826, and there made lifelong friendships with the Tennysons, Thackeray, Spedding, Donne, W. H. Thompson, and the rest of the set. When he came down from the university he settled at Woodbridge. He found pleasure in letter-writing and in boating, but his principal interest was in books. In 1851 he published anonymously *Euphranor, a Dialogue on Youth,* and in the following year, *Polonius, a Collection of Wise Saws and Modern Instances.* He issued in 1853 a free translation of *Six Dramas* of *Calderon,* and six years later gave to the world his rendering of Omar Khayyam, which has made him famous in all the English-speaking countries and has passed through innumerable editions.

FITZGERALD, LORD EDWARD (1763-98), Irish soldier, politician, and conspirator; fought in America, 1781-82; traveled in Canada, 1789, where he was made chief of Bear Indians; on return became M.P. for Kildare; joined United Irishmen, 1796; had share in organizing conspiracy in Dublin, 1797, after discovery of which he was arrested, dying a fortnight later from wound received during struggle preceding his arrest. His wife, Pamela, was said to be *dau.* of Duke of Orleans.

FITZGERALD, FRANCIS SCOTT KEY (1896), American author; *b.* in St. Paul, Minnesota. Student at Princeton College from 1913-1917 which he left to join army. Was second lieutenant in 45th Infantry in 1917 and in 1918 was made first lieutenant in 67th Infantry. From December 1918 February 1919 was Aide-de-Camp to Brigadier-General J. A. Ryan. February 1919 was honorably discharged. Author of *This Side of Paradise,* 1920; *Flappers and Philosophers,* 1920; and *The Beautiful and Damned,* 1921.

FITZGERALD, THOMAS, 10TH EARL OF KILDARE (1513-37), Irish rebel, 1534; ultimately surrendered, was executed and attainted, 1537.

FITZHERBERT, MARIA ANNE, MARIA ANNE SMYTHE (1757-1837), secretly married after death of second husband to George IV. when Prince of Wales in 1785; marriage invalidated by previous Royal Marriages Act. The Prince and Fox denied the marriage, which, on the break with Princess Caroline, was resumed by special papal permission, but finally ended in 1803.

FITZ NEAL, RICHARD, FITZ NIGEL (*d.* 1198), Eng. bp. and treasurer; wrote *Dialogus de Scaccario,* describing exchequer procedure; bp. of London, 1189.

FITZPATRICK, BENJAMIN (1802-69), an American statesman, *b.* in Greene co., Ga. For a time he practiced law but abandoned this on account of his health and became a farmer. He was elected governor of Alabama in 1841 and United States Senator in 1848. He served again in the Senate from 1853 to 1861, resigning when Alabama seceded from the Union. At the close of the Civil War he was chosen president of the Constitution Convention of the State.

FITZROY (37° 49′ S., 144° 59′ E.), manufacturing town N.E. suburb of Melbourne, Victoria, Australia. Pop. 32,000.

FITZROY, ROBERT (1805-65), Brit. admiral and meteorologist; surveyed coasts of Patagonia and Tierra del Fuego, and commanded surveying expeditions of the *Adventure* and *Beagle*, being accompanied by Darwin on latter; gov. of New Zealand, 1843-45; meteorologist to Board of Trade, 1854; pub. *Weather Book*, 1863. Newspaper weather forecasts are based on his system of storm warnings.

FIUME, seapt. at head of Gulf of Quarnero, on the Adriatic (45° 19′ N., 14° 27′ E.), 70 m. by rail S.E. of Trieste, formerly the seat of practically the entire shipping trade of Hungary; was annexed to Hapsburg dominions (1471); a free port (1717-1891); industrial suburb of Sushak is separated by small stream called Rjeka or Fiumara; principal buildings, cathedral, with modern façade copied from Pantheon at Rome, and governor's palace; three harbors, the largest protected by a breakwater and flanked by quay nearly 2 m. in length; industrial establishments included the Hungarian Government's tobacco factory and Whitehead torpedo works; also rice mill and petroleum refinery. During the Great War Fiume was bombed by Ital. airmen, and a naval raid was carried out (Feb. 12, 1918), against Austrian ships in the gulf. Pop. of Fiume, 49,800, including 24,000 Italians, 15,000 Croats or Southern Slavs, 6,000 Magyars, and inhabitants of various nationalities; of Sushak, 13,000, including 12,000 Croats and Slovenes. The claim to Fiume in the peace settlement after the war was contested between Italy and Jugo-Slavia. By the secret Treaty of London, signed by Italy, Britain, and France in 1915, the city was reserved as an outlet for Croatia; but at the Peace Conference (1919) Italy contended that the population was predominantly Italian, the Jugo-Slavs disputing this preponderance as regards the double port of Fiume-Sushak, and claiming it as their only adequate outlet to the sea. Signor Orlando and the Italian delegation withdrew from Paris (April 25, 1919), and the Ital. ministry fell (June 20). The new premier, Signor Nitti, signed the treaties of Versailles and St. Germain, the Fiume question being held in abeyance. On Sept. 12 the Ital. poet-politician-soldier, Gabriele d'Annunzio, sought to solve the problem by a *coup d'etat*, and occupied the city at the head of a band of armed volunteers. He was supported by the majority of the Ital. nation, and the government was unable to take resolute action. On Oct. 25, 1918, the Croats attempted to seize the port; but the revolt was speedily crushed and orde restored. Subsequently Italy reache an agreement with Britain and France but the Amer. president refused hi assent, and the question still remaine open after the San Remo Conference It was finally settled in 1920 by th Treaty of Rapollo which made Fiume free city. See ITALY.

FIVE FORKS, a place near Dinwiddi Courthouse, Virginia, where, on April 1 1865, severe engagements took plac between the Union and Confederat armies, the former commanded b General Sheridan and the latter b General Lee. After heavy fightin which continued for several hours the Confederates were obliged to retrea with a large loss in killed and wounded They left 5,000 prisoners and severa guns in the hands of the Union army The Union loss was about 1,000 men including General Winthrop, who wa killed.

FIVE MEMBERS, the five M.P.' whom Charles I. tried to arrest in 1642 this forming the chief exciting cause of the Civil War. They were John Pym John Hampden, Sir A. Haselrig, William Strode, and Denzil Holles.

FIVE-MILE ACT, Eng. law passed in 1665 forbidding nonconforming divines to minister as clergymen, tutors or teachers within 5 miles of a town or of any place where they had once officiated, unless they took the oath o non-resistance.

FIXED STAR. A star that has appeared immovable through the ages thus differing from 'moving stars' and planets. The term 'fixed' embodies an astronomical error of the ancients that stars were attached or fastened to the firmament. 'Fixed stars' according to early writers, belonged to the Ptolemaic sphere and impelled by the whirling Ninth sphere revolved with it once in 24 hours.

FIXTURES, may be defined under two heads—landlord's f's and tenant's f's. The first-named must remain when a person gives up a tenancy; the second are, in law, such f's as the tenant is duly entitled to remove. It may be noted that an agriculturist may remove fencing, etc., which has been provided by himself, at the expiry of his tenancy; and a market-gardener may remove shrubs, plants, etc.; but an ordinary householder cannot remove trees, bushes, plants, etc., although planted by himself.

FJORD, FIORD, Anglicized form of the Norweg. name for long, narrow, and frequently deep and precipitous inlets of the sea so common in Norway.

FLACCUS, Rom. family; famous members are Quintus Fulvius, distinguished in war against Carthage; Marcus Fulvius supported the Gracchi. Caius Valerius, Rom. poet (I. cent. A.D.), wrote *Argonautica*.

FLACIUS, MATTHIAS (1520-75), Lutheran reformer and writer; father of critical study of ecclesiastical history; wrote *Catalogus Testium Veritatis*.

FLAG, any light cloth flown in the air and bearing device to convey definite meaning or signal; usually attached to a halyard or staff, the end so attached being called the *hoist*, while the length from the staff to the free end is called the *fly*. Of mediæval flags the *pennon* was a mark of knightly rank; it was small, and triangular in shape, and showed the heraldic bearings of the owner; the *banner*, rectangular in shape and varying in size according to rank of owner, was carried by all above the degree of a knight simple, including the king; and the *standard* was of much greater size, and was a tapering flag, generally richly embroidered and slit slightly at the narrow end—it was borne by peers or knights of importance in the Middle Ages. Less important mediæval flags were the *pennoncel*, borne by esquires, the *banderoll*, the *guydon*, and the *gonfanon*.

Regimental flags, called the *colors*, are of silk, with gold and crimson cords and tassels.

The *Royal Standard* (the personal flag of the Brit. sovereign) is a banner in shape, with the arms of England on the first and fourth quarters, the Scot. arms on the second, and those of Ireland on the third. In its Scot. form the royal standard has Scot. arms on first and fourth quarters, Eng. arms on second. The *Union Jack*, the Brit. national flag, is formed by combination of crosses of St. George, St. Andrew, and St. Patrick; the first two were united in 1603, when James VI. of Scotland became James I. of England, the union being effected by keeping the blue field and white St. Andrew's cross of the old Scot. flag, and representing the Eng. white field by a narrow border or fimbriation round the red St. George's cross; in 1801 Ireland joined the union, and St. Patrick's cross was incorporated with the other two. The *ensign* is a naval flag, and is of three colors—red, white, and blue—according to a now obsolete threefold division of the fleet. The *red ensign*, a red flag with the Union Jack in the first quarter, is now used by merchant vessels.

National flags of other countries include: French—*Tricolor*: blue, white, and red vertical stripes, blue being next halyard or staff. Dutch: red, white, and blue horizontal stripes. Belgian: black, yellow, and red vertical stripes. Swiss: a white cross on red field. Spanish: three horizontal stripes, yellow between two reds, crown-surmounted escutcheon on middle stripe. German: since the World War black, red, and gold; while the trade flag is black, white, and red. Italian mercantile marine flag has green, white, and red vertical stripes, with arms of Savoy in center. The flag of the Austrian navy is like that of the merchant service (red, white, and red horizontal stripes) with shield and imperial crown in center. The Russian navy has for flag a blue St. Andrew's cross on white field; the merchant service, white, blue, and red horizontal stripes. The Danish navy has a white St. George's Cross on red field; Swedish navy, yellow St. George's cross on blue field. Greek navy's flag has nine horizontal stripes, blue and white alternately, with white cross and crown in top left-hand corner. Japanese naval flag has red rising sun, with white background. Pirate flag is black, quarantine yellow, mutiny red; flag at half-mast signifies mourning.

FLAG, AMERICAN. The early colonies of America used the British flag, a white banner with the red cross of St. George, but in pre-revolutionary times they had flags of different colors with a device in the upper left-hand corner of a tree, a hemisphere, or some emblem. On the eve of the revolution and during it, banners of all kinds appeared with devices symbolizing liberty, and inscribed with mottoes expressing defiance of Great Britain. After the Battle of Lexington a flag bearing the arms of the colony was used and ships leaving New York carried flags on which a beaver was represented. The 'Pine Tree' flag was flown from many American ships when Washington was in authority. One of the early flags of the South was displayed at Richmond on September, 1775. It was blue with a crescent in the upper left-hand corner and later bore the inscription 'Liberty or Death.' A flag flown by Washington at Cambridge, Mass., in 1776, had thirteen red and white stripes with a Union Jack where the stars are now. One of the most popular flags at this period bore the device of a coiled rattlesnake, having thirteen rattles and the motto 'Don't Tread On Me.' A flag of blue with eight stars was used in Rhode Island, 1776-1777. The Continental Congress first took action in regard to a national flag June 14, 1777, when it passed the resolution 'That the flag of the 13 United States be 13 stripes alternate red and white; that the union be 13 stars in white on a blue field representing a new constellation.' The Congress appointed a committee consisting of Washington, Robert Morris and Col. George Ross to devise the flag with the help of Mrs. Elizabeth Ross. Many believe that the coat-of-arms of the Washington family which contains stars and stripes furnished the main idea for the flag. Paul Jones claimed to have been the first to raise the national flag at sea, and on land the first, hastily put together, was raised over Fort Stanwix, August 6, 1777, after an encounter with the British. After Vermont was admitted to the union in 1791, and Kentucky in 1792, the Congress in 1794 added stars and stripes to the flag for each new state. In 1818 when the states numbered 20, the stripes were reduced again to 13, but the 20 stars remained, and a law was passed 'that on admission of any new state into the Union one star be added to the union of the flag.' On October 26, President Taft by executive order, specified the location of the stars—six rows of eight stars each; the flag of today.

FLAGELLANTS, religious confraternities of Middle Ages, members of which marched in bands, scourging themselves in public in reparation for sin; they became extravagant during plague periods of the XIV. cent.; but, subjected to papal persecution, soon disappeared. A temporary revival occurred in 1414.

FLAGELLATA, MASTIGOPHORA, class containing many often exceedingly minute Protozoa; simplest forms, known as *Monads*, are scarcely distinguishable from Rhizopods, but all are furnished with one or more whip-like filaments or *flagella*, by which they move and capture food. Some live independently in fresh or salt water, and feed upon bacteria and minute organisms; others contain color-bearing grains (chromoplasts or chromatophores) which enable them to live like plants.

FLAGEOLET, simple musical instrument, consisting of straight tube with mouthpiece and finger-holes. See FLUTE.

FLAGG, JAMES MONTGOMERY (1877), an American artist and illustrator, *b.* in Pelham Manor, N. Y. He studied with the Art Student's League, in New York, and later in Herkomer's Art School, in England, and under Victor Marec, in Paris. His illustrations became widely known through their appearance in St. Nicholas and Life and Judge. He has also done considerable portrait painting, exhibiting his portraits both in Paris and New York. He is the author of, among many, *Yankee Girls Abroad*, 1900; *If—A Guide to Bad Manners*, 1905; *The Mystery of the Hated Man*, 1916; and *Girls You Know*, the latter presented in a series of motion pictures under that name.

FLAGLER, HARRY HARKNESS (1870), *b.* in Cleveland, Ohio. In 1897 Bachelor of Arts of Columbia College. Was a reorganizer of Symphony Society of New York for which he served as vice president and president. Devotes most of his time to music although not a professional. In 1914 assumed entire financial backing of the society. President of Millbrook, New York, Free Library. Secretary of Board of Trustees of Brick Presbyterian Church, New York.

FLAGLER, HENRY M. (1830-1913), an American capitalist, *b.* in Canandaigua, N. Y. He had very little schooling, clerked in a country store, later becoming a small manufacturer of salt in Saginaw, Mich. Failing there, he removed to Cleveland, Ohio, where he became acquainted with John D. Rockefeller, with whom he was associated in the organization of the Standard Oil Co. He was, in 1911, the last of the surviving members of the original board of directors of the company. A large portion of the money he acquired he devoted to building hotels in Florida, and it was especially due to him that St. Augustine, Fla., became important as a winter resort.

FLAGSHIP, the ship which in a squadron serves as headquarters of the senior officer commanding; is distinguished by a flag corresponding to his rank. Flag-Captain, officer in command of admiral's ship.

FLAHAUT DE LA BILLARDERIE, AUGUSTE CHARLES JOSEPH, COMTE DE (1785-1870), a French general and diplomatist, the son of Mme. de Souza, and took the name of her first husband, Flahaut de la Billarderie, who was executed in the Reign of Terror, 1793, although it is generally believed that Talleyrand was his father. From 1800 till Waterloo, he was continually in active service, fighting at Landbach, 1805, Friedland and Leipzig, 1813, having served with distinction in the Russian campaign, 1812. His liaison with Hortense de Beauharnais, Queen of Holland, was the result of a devoted attachment. Having taken part in an unsuccessful attempt to put Napoleon

II. on the throne he finally retired to England, where he married a Scottish peeress, who eventually became Baroness Keith.

FLAIL, a club-headed whip used for threshing corn by hand. Also a favorite weapon used in mediæval warfare.

FLAMBOROUGH HEAD (54° 7′ N., 0° 4′ W.), promontory, on Yorkshire coast, England; lighthouse.

FLAMBOYANT, in arch., the last development in Gothic tracery, which prevailed in France during XV. and part of XVI. cent's. The tracery flows upwards in wavy divisions like flames of fire. See ARCHITECTURE.

FLAME. When a gas, or mixture of gases, is heated to a certain temperature it burns with production of light and heat. The amount and color of light varies with the gas burned. Coal gas burns with a yellowish, hydrogen with an almost colorless f. The luminosity of the f. depends (1) on the temperature—the higher it is, the greater the luminosity; (2) on the density of the gases of the f.—the more compressed the gases are, the greater the luminosity; (3) on the amount of solid matter in the f. Powdered charcoal in a hydrogen f. will make it luminous. The incandescent mantle, a film of alkaline earths, increases the luminosity of the ordinary gas jet, and a block of lime placed in the oxyhydrogen f. produces an intense white light. The chief constituents of the ordinary f. is ethylene, which when burned produces carbon dioxide and water.

Four regions can be distinguished in a f.: (1) the inner cone of unburned gas, (2) a non-luminous blue region, (3) a luminous f. with (4) a faintly luminous mantle. In the blue region carbon monoxide and water are formed, with traces of carbon dioxide and hydrogen. The carbon monoxide and hydrogen are oxidized into carbon dioxide and water in the outer cone. In the faintly luminous mantle, carbon monoxide, hydrogen, and small quantities of hydrocarbons which have escaped combustion in the luminous parts of the f. are burned. The non-uminous character of this area is due to the cooling effect of the air, which is drawn into the f. The gases as they reach the luminous area are surrounded by burning material which raises them to the temperature at which marsh gas and ethylene are decomposed into acetylene and hydrogen.

FLAMEN, in ancient Rome, priest n service of some special god; three chief f's were those of Jupiter, Mars, and Quirinus.

FLAMINGO, a long-legged wading bird, intermediate between goose and stork, characterized by long neck and peculiar beak, bent sharply downwards medianly, and exceptional in upper jaw moving on lower; plumage bright pink to scarlet; gregarious, inhabiting subtropical swamps, and breeding in colonies.

FLAMINIA, VIA (43° 15′ N., 12° 45′ E.), one of most ancient highways, Italy; extended from Rome to Ariminum; built by censor G. Flaminius, 220 B. C.

FLAMINIUS, GAIUS, Rom. plebeian soldier and statesman; twice consul; defeated Gauls, 223 B. C.; defeated by Hannibal and killed at *Trasimene Lake*, 217; built Circus Flaminius on Campus Martius, and the Flaminian Way.

FLAMINIUS, TITUS QUINCTIUS (c. 228-174 B. C.), Rom. soldier and politician; subdued Macedonia; became consul, 198; won decisive victory at *Cynoscephalae* in Thessaly, 197; represented Rome in Greece, 192.

FLAMMARION, CAMILLE (1842), Fr. astronomer; entered Paris Observatory as assistant of Le Verrier, 1858; transferred to Bureau des Longitudes, 1862; famous for observations on double stars, star-drift, and common proper motion; great reputation as lecturer; chief work, *Popular Astronomy*.

FLAMMENWERFER ('flame projector'), device borrowed by the Germans from the Gr. fire of the Byzantines and used by them, and subsequently by most of the armies, during the World War; based on principle of blowpipe lamp. A mixture of oil and ether is driven into the flame by compressed nitrogen, and a jet of fire projected between 30 and 50 yards. As the jet is projected in a straight line it cannot be deflected into a trench.

FLAMSTEED, JOHN (1646-1719), first astronomer-royal of England; grad. Cambridge, 1674; app. by Charles II. astronomical observator to king; formed the first trustworthy catalogue of fixed stars, and supplied lunar observations by means of which Newton verified his lunar theory; principal work, *Historia Caelestis*, 1723.

FLANAGAN, JOHN. American sculptor; *b.* in Newark, N. J. Was pupil of Henry Chapu and Alexandre Falguiere, Ecole des Beaux Arts, Paris, and Augustus St. Gaudens, New York. Was awarded prizes and medals by Ecole des Beaux Arts. Executed the bronze relief, 'Antique Education' at the Free Public Library in Newark, N. J., the Monumental Clock, Library of Congress, Washington. At the Knickerbocker Hotel, New York the marble 'Aphrodite' was also his work. A commemorative medal which he did was presented to the city of Verdun for its heroic defense in the World War, by President Harding from the people of the United States. Was represented in various medal collections, including Museum of Ghent, Metropolitan Museum, and American Numismatic Society, New York, Musee du Luxembourg, Paris, Carnegie Institute, Pittsburgh, Art Museum, Newark, N. J., Art Institute, Chicago. In 1921 for 'signal achievement in the art of the medal' was awarded the Saltus Medal of the American Numismatic Society. Member of Connecticut Academy of Fine Arts.

FLANDERS, the land of the Flemings (51° N., 3° E.), comprising modern Belgian provinces of E. and W. Flanders, part of Zeeland (Holland) and of N. France; stretched along North Sea from Somme to Scheldt; famed in Middle Ages for powerful counts and sturdy burghers; center of woolen manufactures, hence intimately connected with England, which supplied wool; had many industrial towns—(*e.g.,*) Bruges and Ghent. Flanders was conquered by Julius Cæsar, 51 B. C.; came under Frankish kings, 9th cent.; Counts of Flanders subject to France for five centuries; William the Conqueror's wife, Matilda, was Count of Flanders's daughter; popular rising under Arteveldes, 14th cent.; Flanders passed to Burgundy, 1384; crushed under Austrian and Spanish rule, 1477-1794 (see Netherlands), not securing independence like United Provinces of north in 16th cent.; France secured part, 1659, 1679, and whole, 1794-1814; incorporated in Netherlands, 1815; since 1831 part of Belgium.

FLANDRAU, CHARLES MACOMB (1871), American author; *b.* in St. Paul, Minn. Bachelor of Arts in 1895 of Harvard College. Author of *Harvard Episodes*, 1897; *The Diary of a Freshman*, 1902; *Viva Mexico*, 1908; *Prejudices*, 1911.

FLANNEL, soft woolen cloth, the best of which is made in Wales, the original home of the industry. The fleecy softness of 'raised' f. is secured by carding; but firmer f. wears better and shrinks less.

FLANNELETTE, fleecy cotton cloth, used as a substitute for flannel. As it is highly inflammable its use for children's clothing is dangerous.

FLAT, a self-contained apartment approached through a stair or a hall with its own entrance door. In English law, occupiers are ordinary tenants, no lodgers; each flat is separately rateabl and has right of support on the flat below. Scots law recognizes absolut right of proprietorship of a flat independently of ownership of the rest.

FLAT-FISHES (*Pleuronectidae*) laterally compressed fishes, which lie o one side, hidden under the surface o sand at the bottom of shallow seas They include some of the most valuabl of food fishes; found in all seas. Th most important forms are halibut an turbot, the brill, a turbot-like fish but without tubercles, the plaice, wit orange spots, the dark-brown flounde or fluke, often found in rivers, the dabs and the almost black elongated soles.

FLAT-HEADS, small tribe of N Amer. Indians, now living in Montana

FLAUBERT, GUSTAVE (1821-80) Fr. novelist; *b.* Rouen. His works, mos of which have been trans. into Eng., ar either realistic novels or hist. romances and include *Madame Bovary*, *Bouvard e Pecuchet*, *Salammbo*, *L'Education sentimentale*, *Trois Contes*, etc. He was slow and careful writer, and one of th greatest stylists France has produced.

FLAVIAN (fl. *c.* 450), bp. of Constantinople and martyr.

FLAX (*Linum usitatissimum*), a annual plant belonging to the famil Linaceæ. It possesses a tall, slende upright stem, clothed with small leave The flower is large and brilliant blue and persists only one day. Man flowers are borne at the apex of th stem. The fruit is a capsule, and contain when ripe ten flat seeds—*linseed*. Th original home of the f. is Western Persia but for many thousand years it has bee cultivated all over the north-temperat and subtropical zones in such station as are suited to it. It demands for it best development a cool and mois climate. In Ireland, Eastern Russia Belgium, and Holland it reaches it finest quality. F. is cultivated for th sake of its seeds and of its fibre. Linsee yields, on pressing, an oil which valuable in the manufacture of pain and of printer's ink. The compresse refuse is used as *oil-cake* for feedin cattle, and the ground seed constitute *linseed meal.*

The *bast* of the stem (that part of th fibre which surrounds the wood) is th raw material of linen. To obtain it the stems, from which the seed pods hav been removed, are rotted for 10 to 1 days in hard water; they are then beate to break up the wood, and subjecte to various combing processes, by means of which the long bast fibres are separated from shorter fibres, and from the wood—these forming the *tow*. From the fibre thus obtained thread is manufactured by spinning, and cloth by weaving the thread.

FLAXMAN, JOHN, R. A. (1755-1826), Eng. sculptor; as a boy had feeble health, but imbibed a love of art from his *f.* who was a moulder of figures. He became an Academy student, and found scope for his abilities as a designer for Wedgewood. In 1782 he began to devote himself to statuary and monumental sculpture, and thus established his fame as the greatest of Eng. classical sculptors, his designs in illustration of Homer, Æschylus, and Dante being especially famous.

FLEAS, from the order *Siphonaptera* or *Aphaniptera*, are wingless, compressed insects, with piercing mouth parts, and are external parasites of almost all animals and birds. They are responsible for the spread of several diseases, (*e.g.*) plague in India. Well-known examples are the human flea (*Pulex irritans*) and the jigger (*Sarcopsylla penetrans*), a terrible American pest.

FLECKNOE, RICHARD (d. *c.* 1678), Eng. poet and dramatist; satirized by Dryden.

FLEET, the entire body of a nation's war-vessels, or a division of the same located in some particular waters; applied also to fishing-boats.

FLEET PRISON, famous jail which stood in Farringdon, St., London; existed in Norman times; destroyed by Great Fire in 1666 and again during Gordon Riots in 1780; used for Star Chamber and Chancery prisoners, debtors, and bankrupts.

FLEET MARRIAGES. Clandestine marriages performed by disreputable or pseudo-parsons in or near Fleet Prison; suppressed in 1754.

FLEET STREET, famous London street, with many newspaper offices; identified with journalism.

FLEETWOOD (53° 56′ N., 3° 1′ W.), seaport, watering-place, Lancashire, Eng. fisheries. Pop. 16,000.

FLEETWOOD, CHARLES (*d.* 1629), Eng. politician and soldier; Roundhead in Civil War; present at *Dunbar* and *Worcester*; commander-in-chief, Ireland, 1652-55; commander-in-chief, 1659.

FLEMING, RICHARD (fl. 1406-31), Eng. ecclesiastic; founder of Lincoln Coll. Oxford.

FLEMISH LITERATURE, see HOLLAND (Language and Literature).

FLENSBURG (54° 46′ N., 9° 26′ E.), seaport, Germany; breweries, distilleries. Pop. 1919, 60,941.

FLERS (48° 44′ N., 0° 35′ W.), town, Orne, France; linen and cotton manufactures. Pop. 14,000.

FLESH-FLY, general term for flies whose larvæ feed on flesh; the common European species is *S. carnaria*; the American, *S. sarracenia.*

FLETCHER, ANDREW, OF SALTOUN (1655-1716), Scots. politician; took part in Monmouth's rising of 1685; afterwards traveled; returned to Scotland, 1689; was prominent politician from 1703 till 1707; opposing Anglo-Scot. Union.

FLETCHER, DUNCAN UPSHAW (1859), a U.S. senator; *b.* in Sumter co., Ga. Graduating from Vanderbilt University, Tenn., in law, he began to practice in Jacksonville, Fla., in 1881. In 1893 he was elected to the State House of Representatives and during 1893-5 served as mayor of Jacksonville. During 1905-8 he was chairman of the Democratic State Committee. In 1908 he was nominated at a primary election and appointed by the Governor to represent the state in the U.S. Senate for the term 1909-15. He was re-elected for the term 1921-27.

FLETCHER, FRANK FRIDAY (1855) an American admiral; *b.* at Oskaloosa, Ia. After graduating from the Naval Academy, at Annapolis, he entered the service and was promoted through the various grades to the rank of rear admiral, in 1911. He was commander-in-chief of the Atlantic Fleet, in 1914, and was promoted to the rank of admiral shortly after. He is the inventor of the Fletcher breech mechanism and gun mounts.

FLETCHER, GILES (1548-1611), Eng. author and State official; wrote *The Russe Commonwealth.*

FLETCHER, GILES (1584-1623), Eng. poet; *s.* of above; author of *Christ's Victory* (1610).

FLETCHER, HENRY PRATHER (1873), diplomat; *b.* in Green Castle, Pennsylvania. Educated by private tutors and at Chambersburg Academy. Studied law for four years and was admitted to the bar in 1894. 1896-1898 member of firm Rowe and Fletcher. Official reporter, 1891-1898 of 39th Judicial district, Pennsylvania. Was a private in the Rough Riders. 1902-1903 second secretary to American Legation in Cuba, and 1903-1905 in China. In Portugal 1905-1907 as secretary to American Legation. In China as first secretary to American Legation, 1907-1909. Was under secretary of State from 1921 to March 1922. Since March 1922 Ambassador to Belgium. Was member American Society International Law.

FLETCHER, HORACE (1849-1919), Amer. dietician; founder of system (*Fletcherism*) for mastication of food.

FLETCHER, JOHN (1579-1625), collaborated with Francis Beaumont.

FLETCHER, JOHN WILLIAM (1729-85), Eng. clergyman; intimate friend of Wesley.

FLETCHER, PHINEAS (1582-1650), Eng. poet, bro. of Giles F. (jun.); author of *The Purple Island.*

FLEURANGES, ROBERT (III.) DE LA MARCK (1491-1537), Fr. marshal and historian; distinguished at *Marignano,* 1515; captured Cremona; imprisoned in Flanders, where he wrote his history.

FLEUR-DE-LIS, the lily-flower heraldic device borne as the royal arms of France from very early times down to the extinction of the monarchy. The triple heads are said to typify the Trinity.

FLEURUS (50° 30′ N., 4° 33′ E.), village, Belgium; scene of four battles in Span. and Fr. wars. Pop. 6,000.

FLEURY, ANDRÈ HERCULE DE (1653-1743), Fr. politician and ecclesiastic; cardinal, 1726; governed France, 1726-43; tried to maintain peace, improved commerce; sent force against Austrians, 1733.

FLEURY, CLAUDE (1640-1723), Fr. Church historian; educated several Fr. princes; wrote *Historie Ecclesiastique,* work of great learning in twenty vol's.

FLEXNER, ABRAHAM (1866), an American educator; *b.* in Louisville, Ky., and the brother of Simon Flexner. He graduated in 1886 from Johns Hopkins, continuing his post graduate studies at Harvard and the University of Berlin. Since 1908 he has been connected with the Carnegie Foundation for the Advancement of Teaching, of which institution he has been secretary since 1917. He is the author of *The American College,* 1909; *Medical Education in the United States and Canada,* 1910; and *A Modern School,* 1916.

FLEXNER, SIMON (1863), Amer. pathologist; discovered (with Jobling) serum treatment for cerebro-spinal meningitis.

FLIEDNER, THEODOR (1800-64), Ger. Lutheran pastor; founder of Prot. order of Deaconesses; pastor of Kaiserswerth, 1822; founded there deaconesses' home and seminary for infant-school teachers.

FLIGHT is the passage of an animal through the air by means of wings, which are limbs specially adapted for the purpose. Flying animals—which include insects, birds, and bats, but not so-called flying squirrels, flying opossums, or flying fish—whatever their species and however different the appearance of their wings, all fly according to the same principles. It has been supposed that the air-sacs and cavities in the bones of birds when filled with heated air support the birds after the manner of a balloon; but this has been disproved, the purpose of the sacs being to assist in regulating the temperature and in aerating the lungs more completely, and the flight of birds is due to the weight of the animal and the power of the wings inducing a resistance in the air sufficient to propel it upwards and onwards. Weight is as necessary as power for the purpose of flight, as, without sufficient weight to overcome air currents simply by inertia, the animal would be unable to direct its movements, and would be at the mercy of every wind that blows. This fact is greatly in favor of the idea that a flying machine should not be a light balloon structure, having a very large surface exposed, but should be comparatively heavy and compact, depending for its ability to fly solely on the power of its flying mechanism.

Pettigrew (1867) has shown that the wings of all flying animals are built as screws, and when they vibrate they twist in opposite directions during the up and the down strokes, striking upwards and forwards for the up strokes, and downwards and forwards during the down strokes, passing through the air obliquely as a boy's kite when pulled on, or as an oar in the water in rowing. Prof. Marey, a few years afterwards, elaborated the theories of Pettigrew by means of the sphygmograph (an instrument in which movements are recorded by a pointer on a revolving drum) and by photography, showing the movements of the different feathers of a wing. The wings of birds and other animals are made to vibrate at very high rates of speed, and in the course of a vibration they cover over a large space so rapidly that it forms, as it were, a solid support for the animal and by vibrating at a high speed light wings of small size perform the work of heavy wings of large size vibrating slowly, while the resistance of the air is also greater to a swiftly moving object than to one moving slowly, so that the propulsion of the animal is much assisted. This may also be brought about by the velocity of the wind being high, so that one sees birds flying easily in a breeze with but little movement of their wings. Since the parts of the wing nearest to the body of the animal pass through a very much shorter space than those farthest away in exactly the same time, the wing is necessarily an elastic body so as to avoid violent vibration of its parts. The most notable application of the theories of flight to actual flying was made by S. P. Langley, the American scientist, who devoted all his mature life to the study of aeronautics. He achieved the first actual flight in the air, and the application of his theories by the Wright brothers led to their final success. See Langley, S. P., Aeronautics.

FLINDERS, MATTHEW (1774-1814) Eng. explorer; entered navy, 1790; fought in *Bellerophon*, 1794; surveyed great part of Australian coast, 1795-96, discovering Bass Strait; led expedition to explore Australian coast, 1801; on return wrecked, and imprisoned at Mauritius for six years; returned to England, 1810; pub. *A Voyage to Terra Australis*, 1814.

FLINT, variety of quartz; color, brown, red, yellow, or grey; clouded, marbled, spotted, or veined; found embedded in chalk in round lumps or nodules; readily strikes spark with steel; easily split into sharp fragments, whence much used by ancients for knives, axes, and arrow-heads; now used in manufacture of earthenware and glass.

FLINT, a city of Michigan, in Genessee co., of which it is the county seat. It is on the Grand Trunk Western and on the Pere Marquette railroads, and on the Flint river. The city has important industrial establishments including saw mills, carriage and wagon factories, flour and woolen mills, automobile works, etc. The public institutions include a court-house, high school, State Institute for the Deaf and Dumb, and a private sanitarium for the insane. There are banks, a public library and daily, weekly and monthly periodicals. Pop. 1920, 91,599.

FLINT, AUSTIN (1812-1886), an American physician; *b.* in Petersham, Mass. He graduated from the medical college of Harvard University, in 1833, and practiced, first in Boston, later in Buffalo, N. Y. In 1846 he founded The Medical Journal. He also was one of the founders of the Buffalo Medical College. During 1872-75 he was president of the New York Academy of Medicine.

FLINT, CHARLES RANLETT (1850), merchant and banker; *b.* in Maine. Was graduate of Polytechnic Institute, Brooklyn. Was partner of W. R. Grace and Company and Gilchrist, Flint and Company. 1877-1879 was Chilean consul, New York. Was consul-general of Costa Rica and Nicaragua to United States. Became member of firm of Flint and Company in 1885. Was a representative of United States on Banking Committee and recommended an International American Bank. In 1893 for Brazil fitted a fleet of war vessels. In 1896, between New York and San Francisco established Pacific Coast Clipper Line. At Syracuse in 1897 was chairman of reorganization committee that consolidated street railways. 1904-1905 went to Turkey and other countries as agent of Russia. Was known as 'Father of Trusts.' Chairman of American Committee for Encouragement of Democratic Government in Russia.

FLINTSHIRE (53° 15′ N., 3° 8′ W.), county, N. Wales; bounded N. by Irish Sea, N. E. by Dee, E. by Cheshire, S. W. by Denbighshire; detached portion Mælor lies a few miles S. E.; area, 255 sq. miles. F. produces coal, limestone, zinc, lead, iron; good pasturage; main rivers, Dee and Clwyd; chief towns, Mold, Flint (county town), St. Asaph; ruins of F. Castle; Hawarden (Gladstone's home). Pop. 106,500.

FLOATING BATTERY, device for coast defense or attack against coast fortifications; a floating gun-platform, heavily armed, with small navigating power.

FLOATING ISLAND, common in Chinese rivers and lakes; an artificial island of earth and vegetation on a floating platform of wood.

FLODDEN (55° 36′ N., 2° 7′ W.), hill near village of Branxton, Northumberland, England; scene of battle, Sept. 9, 1513, in which Scots were defeated by English, and James IV., king of Scots and many of his nobles slain.

FLODOARD, a Fr. priest (894-966) whose chronicles of Reims Cathedral are of much value to the historian.

FLOGGING. (1) Of civilians, see Whipping. (2) In the navy, was a constantly inflicted and excessively severe punishment down to 1847, when it was mitigated; since 1879 it has practically been abolished. (3) In the army, was limited to fifty lashes with the 'cat' in 1848; abolished in 1881.

FLOOD, HENRY (1732-91), Irish orator and politician; elected to Irish Parliament, 1759; became leader of national party; vice-treasurer of Ireland, 1775, holding office till 1781.

FLOODS AND INUNDATIONS, due most commonly to excessive rains or melting snows, which cause rivers to rise and overflow their banks. Some rivers present this phenomenon annually. The rising and falling of the Nile in this way is no disaster, but has been made by man the basis of Egyptian agriculture. The Mississippi, the Missouri, and the Ohio valleys are liable to floods, and these can be predicted with comparative accuracy; the last great inundations occurred in 1897. In China the Hoang-ho R. is especially liable to become swollen after leaving its mountainous region and entering upon its long, low delta course. Levees 70 ft. high proved ineffectual in the disaster of 1887, when 1,000,000 people were drowned and tens of thousands perished by disease and famine ensuing. The breaking up of ice and glacier dams cause inundations in the valleys of the tributaries of the Indus. River floods less catastrophic in nature, but sufficiently disastrous, occurred in France in January 1910, and in England in the summer of 1912. In France heavy rains caused the waters of the Marne, Loire, Yonne, and other rivers to flood their valleys; this swelled the Seine and Paris was inundated. 'Tidal waves,' occurring when high winds drive the waters of the sea on to the land at periods of high tides, are a less frequent cause of inundation. Notable floods of this nature occurred in the Netherlands in 1421, but the construction of more and more invulnerable dykes have made the country decreasingly subject to these disasters. The West Indies, the Gulf Coast, the Middle Atlantic States, etc., are liable to inundation at the periods of tropical hurricanes. Earthquake shocks disturbing the sea may cause inundation of the adjoining land; the catastrophe in which Lisbon was destroyed in 1775 was of this nature. For the Noachian flood, see DELUGE.

FLOOR COVERINGS. See CARPETS.

FLOQUET, CHARLES THOMAS (1828-96), Fr. politician; Pres. of Chamber, 1885, 1886-87, 1889-92; concerned in Panama case, 1892.

FLORA (classical myth.), Rom. goddess of the spring-time, and of flowers.

FLORENCE, a city of Alabama, in Lauderdale co., of which it is the county seat. It is on the Southern and the Louisville and Nashville railroads, and on the Tennessee river. The city has important manufactures of iron, cotton, wagons, flour, stoves, etc. Here is the State Normal College, a high school, churches and weekly newspapers. Pop. 1920, 10,529.

FLORENCE, a city of South Carolina in Florence co., of which it is the county seat. It is on the Atlantic Coast Line and the Southern Carolina Western railroads. The city is surrounded by an important agricultural region and is the center of a large trade in tobacco and cotton. Its industries, which are important, include cottonseed oil mills, railway repair shops, machine shops, lumber mills, etc. Florida is the seat of the South Carolina Industrial School and the State Agricultural Experiment Station, and a national cemetery is within its limits. Pop. 1920, 10,968.

FLORENCE, or **FIRENZE,** Tuscan city, Italy (43° 46′ N., 11° 15′ E.), on Arno, in fertile valley among Appenines; cap. of Florence prov.; world-famous for its art treasures, glorious history, and natural beauty; abounds in wonderful mediæval and Renaissance buildings, rich picture-galleries, fine statuary, gardens, etc. Among most notable churches are the Duomo (magnificent cathedral; begun 1294), with Campanile of Giotto (1334 onwards), Baptistery (12th cent.; famous bronze doorways) and Museum (containing Della Robbia's reliefs); San Lorenzo (with Laurentian Library, Brunelleschi's Old Sacristy, Michelangelo's New Sacristy, and the Medici tombs), Santissima Annunziata (founded 1250; Del Sarto frescoes), La Badia (rebuilt 1285, 1625), Santa Croce (begun 1294; beautiful cloisters; tombs of Michelangelo and Alfieri). San Marco monastery (15th cent.), Santa Maria Novella (begun 1278; Span. Chapel and 'Green Cloisters'), San Miniato (11th cent.; Tuscan Romanesque), Or San Michele (Gothic; 14th cent.; tabernacle by Orcagna), Santo Spirito, 1487; Santa Maria del Carmine, dating from 1422; celebrated frescoes. Famous palaces include Palazzo Vecchio (1300-1600; now town hall), Uffizi (picture and sculpture galleries; many masterpieces, including *Venus de Medici*), connected by long corridor crossing Arno on famous 14th cent. Ponte Vecchio with Pitti Palace (begun 1440; more masterpieces; lovely Boboli Gardens), Palazzo Medici or Riccardi, *c.* 1430; Palazzo Strozzi, 1489-1550. Other leading features are Loggia dei Lanzi, 14th cent. arcade with celebrated sculptures, Il Bargello (National Museum; art treasures), Academia di

Belli Arti (art collection), Archæological Museum, Il Bigallo (Gothic loggia; 1352-8), Michelangelo's house, city walls (13th cent.) and gates, Cascine (park), Prot. cemetery (graves of Mrs. Browning, Savage Landor, Clough, etc.), Lung' Arno (an interesting riverside promenade).

A provincial town, Florence now lives on former glories; favorite tourist center and residential resort for foreigners. Industries include straw-plaiting, jewelry, porcelain, glass, mosaics, works of art, etc. Pop. 1920, 232,860.

FLORENCE, COUNCIL OF (from 1438), a council which met with object of uniting Gk. and Rom. Churches; first formal meeting at Ferrara, 1438; first session, Florence, Feb. 1439. Subjects discussed were the *filioque*, pontifical supremacy, Eucharist, and purgatory. Union was decreed and signed by Pope and Byzantine emperor, July 1439; Union of Armenians, Jacobites, Syrians subsequently decreed at various dates; Union finally refused by Constantinople Synod, 1472.

FLORENCE CRITTENTON MISSION, a philanthropic institution, founded in the early 90's by Charles Nelson Crittenton, in honor of his dead daughter Florence. The original mission was a home of refuge open to friendless and homeless girls. So successful was it in achieving its aim that similar missions were established in all the large cities of the country, all of which combined under a single charter, in 1895, under the name of the National Florence Crittenton Mission. The institution includes 68 homes and schools, most of them in the United States, and several abroad.

FLORENCE OF WORCESTER (*d.* 1118), Eng. chronicler and monk.

FLORES.—(1) (39° 20′ N., 31° 18′ W.), westernmost of the Azores Islands. (2) (8° 30′ S., 121° E.), island, Dutch E. Indies, S. of Celebes.

FLORIAN, ST. (*c.* 190-230), martyr, whose relics were treasured in Poland.

FLORIANOPOLIS (27° 36′ S., 48° 27′ W.), city, on W. coast of island Santa Catherina, Brazil; exports dairy and agricultural produce. Pop. 33,000.

FLORIDA, most south-easterly state of U.S. (24° 30′-31° N., 79° 48′-87° 38′ W.), situated on a peninsula between Atlantic and Gulf of Mexico; bounded on N. by Georgia and Alabama, and S. by Florida Channel. Coast (*c.* 1,200 m.) has many islands, bays, and keys, the latter being sometimes rocky, sometimes overgrown, and with fertile soil. Interior is low and flat (highest point *c.* 300 ft.); numerous lakes—the largest being Okeechobee in S. (*c.* 1,250 sq. m. and shallow); many marshes and swamps, of which the largest are: the Everglades in S. connected with Lake Okeechobee, the Kissimmee, Cypress, and part of the Okefenokee swamps. There are abundant springs, many mineral; large number of rivers, of which the most important and navigable are: St. John's, Suwanee, Escambia, Choctawatchee, and Apalachicola. The climate is sub-tropical, but cooled by sea breezes; subject to occasional severe frosts which destroy the orchard fruits; healthy, and is a favorite holiday resort although malaria is not unknown. The soil, although sandy, is various, and fertilized by heavy rains (the annual fall being *c.* 54 in.); great expanses of swamp, drained, have become fertile land; fruit grows abundantly (ann. value of crop being about $7,500,000), and market gardening is carried on extensively; low hummocks, dry enough for cultivation, produce large crops of cotton, sugar-cane, and grain; coconuts grow, and natural products include Ind. corn, coffee, rice, and tobacco; valuable timber forests. Animals include black bears, cougars, wild-cats, wolves, alligators, and small game. Industries comprise tobacco manufacture, lumber trade, turpentine, tar, rosin, and pitch works, sugar making, salt evaporation, coral and sponge fishing; also valuable fisheries. In recent years the east coast of Florida has become a popular winter resort. Palm Beach, Miami, Daytona, and other places have developed into large cities, with magnificent hotels. Chief towns: Tallahassee (cap.), Key West, Jacksonville, Pensacola, Lake City with State College. Florida was discovered 1513 by Juan Ponce de Leon; explored by De Soto, 1539; Spanish till 1763; British till 1783; Spanish again till 1819, when ceded to U.S.; admitted into Union as state, 1845; war with aborigines, 1834-42; state, taking Confederate side, not readmitted to Union till 1868.

Florida is governed by a senate of 32 and a house of representatives of 75 members; senators are elected for four years, representatives for two. Area, 58,666 sq. m. (of which 3,805 sq. m. is water); pop. 1920, 968,470 (of whom 360,000 are negroes.) See MAP UNITED STATES.

FLORIDA (34° 7′ S., 56° 11′ W.), town, capital of F. department, Uruguay. Pop. *c.* 2,500. Department has area 4763 sq. miles. Pop. 1920, 65,658.

FLORIDA CHANNEL (26° N., 79° 40′ W.), strait separating Florida state from Bahamas and Cuba.

FLORIDA COAST LINE CANAL. See CANAL.

FLORIDA KEYS OR REEFS, a chain of small islands, keys or reefs, consisting chiefly of sand which extends from Cape Florida, southwest about 220 miles. There are many of these but only a few are of any considerable importance. Among these are Indian Key, Long Island; New Matcombs, and Key West, on which the city of Key West is built. The Florida East Coast Railway crosses the keys. Its construction is one of the greatest feats of engineering ever accomplished.

FLORIDA, UNIVERSITY OF, founded by the State, in 1905, at Gainesville, Fla. Its courses include agriculture, the sciences, law, education, commercial theory and practice and sociology. During the term 1921-22 it had a student body of 922 and a faculty of 54. It has 40,000 volumes in its library.

FLORIN, originally a Florentine gold coin; Eng. gold f's were struck by Edward III.; the silver f. (value 2s.) dates from 1849.

FLORIO, JOHN (*c.* 1553-1625), Eng. scholar and translator; pub. an Ital. Eng. dictionary and other works; famous as the translator of Montaigne's Essays, 1603. He was an intimate of Jonson, and, presumably, of Shakespeare.

FLORUS, JULIUS, Rom. jurist and poet; *fl.* during the reign of Augustus.

FLORUS (II. cent. A.D.), Rom. historian.

FLOTOW, FREDERICH, BARON VON (1812-83), a German composer, *b.* at Tentendorf in Mecklenburg. His first great success was *Le Naufrage de la Meduse*, an opera produced in 1839; *Alessandro Stradella*, in 1844; and *Martha* in 1847 being equally popular. Among his later operas may be mentioned: *Indra*, 1853; *La Veuve Grapin*, 1859; and *L'Ombre*, 1869. The characteristics of his works were those of liveliness, easiness, and grace, combined with pleasing melodies. From 1856-63 he held the appointment of director of the theatre at Schwerin, and died at Wiesbaden.

FLOTSAM, JETSAM, AND LAGAN (or *Ligan*), goods cast away at sea. The first is the name given to goods that float on the surface of the water; the second to goods that have sunk; the third to sunken goods attached to a buoy, or other sea-mark. Goods under all three headings become crown property, failing the original owner's claiming them.

FLOUNDER. See FLAT-FISHES.

FLOUR, the powdered and refined grain of wheat, rye, and other cereals, but particularly of wheat. The ground oat-berry is called *meal*. The grinding of wheat by means of stones (pestle and mortar) dates back to a very early period, and is known to have been the system employed several cent's B.C. Later, stone rollers were employed, to be followed by iron ones, but present-day milling is done with chilled steel rollers. In modern f.-milling the grain is carefully cleansed before it is ground, and in the process of milling the outer husks and all the constituent parts of the wheat-berry are carefully separated. It was claimed that this excessive refining process removed from the f. highly necessary nutritive properties, but public opinion will probably remain divided as to the use of highly refined white bread and whole-meal bread, in the latter of which the husk is ground up along with the kernel of the berry. Whole-meal bread, it is claimed, is more nourishing than white bread, but, on the other hand, it is often found to disagree with delicate digestions, and in that case reliance upon white bread becomes a necessity. Oats are more nourishing than wheat, because they contain a larger quantity of saline and fatty matter.

FLOURENS, MARIE JEAN PIERRE (1794-1867), Fr. physiologist, pupil of Cuvier; prof. of Comparative Anatomy in Museum of Jardin du Roi, 1832; prof. of Natural History in Collège de France, 1855; author of numerous works on physiology and natural history.

FLOWER, a specialized shoot of limited growth bearing the essential organs of reproduction, the stamens and carpels, apically. The portion of the shoot which bears the stamens and carpels is termed the receptacle, and as a rule also carries two other sets of leaves —the sepals, protective in character and collectively forming the *calyx*, and the petals, often brightly colored and insect-attracting, termed the *corolla*. Where, as in the Liliaceæ, the calyx and corolla do not differ in appearance, they are grouped together as the *perianth*.

The *calyx* is primarily protective, and so is often tough and may be covered with hairs. In some cases its functions cease with the opening of the flower, as in the poppy, in which the petals are shed as the bud unfolds; in most other cases its functions extend throughout the life of the flower, whilst in a few (*e.g.*, Rosaceæ, Leguminosæ) it is persistent and protects the developing fruit. Certain of the Ranunculaceæ, such as delphinium and aconitum, have developed petaloid brightly colored calices, owing to the reduction and modification of the petals as nectaries, whilst the catkin-bearing flowers are devoid of calyx, their place being taken by overlapping scales.

Stamens and Petals.—The *sepals* in the higher groups are coherent or gamosepalous, this usually being accompanied by a similar fusion of the *petals*, termed gamopetaly. Whilst most flowers are radially symmetrical or actinomorphic, there is in nearly all groups a tendency to bilateral symmetry or zygomorphy, owing to the development of nectariferous spurs or other honey-protecting devices. Thus we have the larkspur and monkshood in the Ranunculaceæ, the Papilionaceæ, such as the sweet pea, the Labiatæ, Scrophulariaceæ, and many others, exhibiting this character, which tends to prevent all but those insects efficient as pollen-bearers from obtaining the secreted honey. The *stamens* are numerous in many groups (Rosaceæ, Ranunculaceæ) and are arranged spirally, but there is a general tendency to reduction in most groups correlated with the greater specialization of the remaining floral members.

Pollination.—The carpels bear one or more ovules, and at the apex possess a specialized receptive portion for the pollen grains, which is termed the *stigma*, and is often of either a sticky or a brush-like character. Each ovule when mature contains a central embryo-sac in which there are three nuclear groups: (1) the egg-cell, forming the embryo on fertilization, and two synergidæ; (2) the polar nuclei, which, on fusion with the second male nucleus, form helicoid and scorpioid cymes, which result from unilateral branching. The raceme which develops sessile flowers is termed a spike (*e.g.* barley), whilst if the main axis is foreshortened so that all the florets appear to spring from one level, like the ribs of an umbrella, a racemose umbel results (Umbelliferæ). Finally, by the development of sessile flowers on the foreshortened and apically flattened main axis, a dense head of florets termed a capitulum is produced, such as occurs in the dandelion, daisy, and other Compositæ.

FLOWERS, ARTIFICIAL, are used chiefly in millinery and for decorative purposes. France, Belgium, Britain, and Holland are the chief centers of production; chief materials used are taffetas, muslins, satins; cotton wool, wire, and paper; thin metal sheets and blown glass; occasionally stone and china ware.

FLOWER BENJAMIN ORANGE (1858-1918), an American journalist and author, founded the *Arena* and remained its editor until 1896. Later he edited the *Coming Age*, which was amalgamated to the *Arena*. This position he kept till the paper died in 1910. From that date he edited the *Twentieth Century Magazine.*

FLOWER, ROSWELL PETTIBONE (1835-1899), an American banker and philanthropist, *b.* in Jefferson County, N.Y. He began business in Watertown N.Y., where he also became influential in local politics, as a member of the Democratic Party. In 1886 he was elected to Congress, and again in 1888 and 1890. In 1891 he was elected Governor of New York. Having made a fortune in business, he devoted large sums to philanthropy, one of the largest hospitals in New York being named after him.

FLOYD, JOHN BUCHANAN (1807-1863), Secretary of War under President Buchanan, *b.* in Blacksburg, Va. He studied law, was a member of the Virginia House of Representatives and during 1850-3 Governor of the State, being appointed Secretary of War by President Buchanan in 1857. Considerable notoriety was attached to him at a later period when it became evident that during his term in office he used his authority to have the arms and munitions in the U.S. arsenals in the northern states transferred to those in the South, and authorized the sale of a great number of rifles to private citizens in Southern states, all apparently done in anticipation of the impending struggle and to favor the Confederacy. Shortly after the outbreak of hostilities he fled into the Confederate lines, where he was commissioned a brigadier-general.

FLUID, a term describing states of matter which *flow*—(*i.e.*), the liquid and gaseous. For the physics of fluids, see under HYDRO-MECHANICS.

FLUORESCEIN, or **RESORCINPHTHALEIN** ($C_{20}H_{12}O_5$), alkaline solution; shows magnificent yellow-green fluorescence which is imparted to wool and silk; color is faint and fades, but mixed with other dyes it imparts fluorescence.

FLUORESCENCE, discovered by Brewster in 1833, in a self-luminosity exhibited by certain bodies, such as fluor-spar. It differs from phosphorescence in the time it lasts after the light is cut off, disappearing instantaneously in liquids, not quite so abruptly in solids. If a beam of sunlight is allowed to fall on a solution of chlorophyll, which is green, it becomes in the fluid a bright blood-red color. Some bodies exhibit fluorescence only in the liquid state, others in the solid state only. Solutions of sulphate of quinine in sulphuric acid have a blue fluorescence. Fluorescence is probably produced by some molecular change in the body.

FLUORINE (F=18.9), an irritating gas and the most energetic halogen; combines with all elements except nitrogen and oxygen. It is liberated on passing an electric current through hydrofluoric acid in platinum vessels. It decomposes cold water, and has bleaching and antiseptic properties. Hydrofluoric Acid (H.F.), obtained by decomposing fluor-spar with strong sulphuric acid, is a colorless volatile (the vapor being a deadly poison) liquid; M.P. 19° C. It is chemically very active, attacking glass (whence its use for glass etching), and its salts are called fluorides.

FLUOR-SPAR, DERBYSHIRE SPAR, FLUORITE, transparent mineral, common in Cornwall and Derbyshire; composition, fluoride of calcium. Generally colorless but sometimes of yellowish or greenish hue, also found bluish and reddish. Often found in tin or lead mines, but also in granites, slates, and limestones; made into vases and ornaments.

FLUSHING, VLISSINGEN (51° 26′ N., 3° 34′ E.), fortified seaport town, Zeeland, Holland, on island Walcheren; active shipping trade. Pop. 1920, 23,025.

FLUTE (Ital. *flauto*; Fr. *flute*), a wood-wind instrument which produces sound by the player partly covering the 'embouchure' or mouth-hole with the lower lip, and blowing against the opposite side of the mouth-hole. The f., which is a very ancient instrument, consisted of one piece in its original form, and until comparatively recent times had only finger-holes and no keys. The old *Flute-a-bec* was played straight to the mouth. The 'transverse' f. was not known until a few cent's ago, and the modern instrument of this type has been carried to a high pitch of perfection by a succession of improvements, due among others to Quantz, Boehm, Siccama, Clinton, and Carte. First one key then others were introduced, until the present eight-keyed f. was evolved. By this means the player was enabled to give the complete chromatic scale with a fair amount of accuracy. But the f. was still an unsatisfactory instrument until the middle of the XIX. cent. when an immense improvement in tone was effected. Boehm replaced the 'cone' f. (with conical body and cylindrical head) by the 'cylindrical' f. (with cylindrical body and conical head). This change, together with the substitution of open for closed keys, gave the f. a much more perfect quality of tone and intonation. The f. is generally made of wood or ebonite, and consists of three parts—head, body, and foot; modern f. has a compass of three octaves with chromatic semitone; it is a non-transposing instrument, and in orchestra is assigned the leading part among wood-winds. Many instruments, simple and complex, belong to the f. family, (*e.g.*) concert f., piccolo or octave f. (which is pitched one octave higher than concert f.), fife, old-fashioned *Flute d'Amour* made in A, and straight or 'fipple' f.'s, such as recorder, *Flute-a-bec*, flageolet, and whistle.

FLUXION, a name given by Newton to the rate of flow or change of a variable quantity, called a *fluent*. F's was the name of what is now commonly known as the Infinitesimal Calculus, and the *method of f's* differed from the method of infinitesimal calculus in referring the rate of change of y not to the independent variable x, but to time (t), to which the change of x was also referred.

FLY. See House-Fly.

FLY (8° S., 143° E.), river, New Guinea; enters Gulf of Papua.

FLY-CATCHER, or **'BEAM-BIRD'** (*Muscicapa grisola*), a late spring migrant; plumage, similar in both sexes, brownish above, with darker streaks—under parts pale with brown markings; food chiefly small insects, occasionally berries.

FLYING BUTTRESS, in arch., an open buttress for supporting the thrust of a vault.

FLYING COLUMN, military light detachment, usually composed of all arms, for quick movements.

FLYING DUTCHMAN, the phantom ship of Vanderdecken, doomed to beat around the Cape of Good Hope; its appearance was said to presage evil; opera of Wagner's.

FLYING FISH, so named from its habit of leaping from water to escape foes, by means of powerful tail-stroke; pectoral fins extremely elongated and wing-like, acting as sustaining gliding-planes.

FLYING FOXES, FOX-BATS, FRUIT-BATS (*Pteropodidoe*), family of Bats, containing 136 species, distinguished by enormous size (up to 5 feet from tip to tip of wings); many have fox-like heads; feed on fruits, flowers, and the juices of trees; occur in warmer regions of Old World.

FLYING SQUIRREL, a general term including certain rodents of squirrel family, characterized by possession of a tough membrane stretching from body wall to toes, which assists in parachute-like flight from tree to tree.

FLY-WHEEL. See ENGINES.

FOCA, town, Bosnia; chief industry, silver filigree and inlaid work; formerly Turkish capital of Herzegovina vilayet. Pop. *c.* 5,000.

FOCH, FERDINAND (1851), Fr. marshal and member of Fr. Academy; *b.* at Tarbes; educated at Metz; joined army during Franco-Prussian War; entered artillery school and passed out with distinction; lieutenant, 1875; captain, 1878; in 1885 entered Staff Coll.; lecturer on military history, strategy, and applied tactics, 1885; his lectures pub. as *Des Principes de la Guerre* (1903, Eng. trans. by Belloc, 1918), at once recognized as of sterling merit; also wrote standard books on tactics, and was generally regarded as brilliant exponent of the art of war; lieutenant-colonel, 1898; colonel, 1903; general commanding 13th Infantry Division, 1907. At first battle of Marne Sept. 1914, in command of 9th Army between Sézanne and Mailly; for three days on defensive, and forced to retreat; having drawn enemy into marshes of St. Gond, took them in flank and hurled them over river. Again distinguished himself during first battle of Ypres, when his assistance was invoked by Sir John French. In great Somme offensive of 1916 the Fr. armies co-operated under his direction. Finally, in the darkest days of 1918, when unity of command was agreed upon, he was appointed generalissimo of the Allied armies in France and Flanders, March 1918. The turning-point came in the middle of July at the second battle of the Marne, and thereafter with consummate ability he struck that arpeggio of ringing blows which demoralized the German armies and forced them to sue for an armistice. He was made marshal of France, 1918; a Brit. field-marshal. Physically, a man of middle height with a massive head, deep bass voice, grey-blue eyes, and the typical Fr. military moustache; laconic and staccato in speech, and essentially mathematical in expression and point of view. His marvelous success was due to the practical application of sound principles combined with an absolute mastery of technique, a quick perception, a genius for co-ordination, a capacity for envisaging the situation in a comprehensive fashion, allied with the virtue of 'calculated tenacity.' Essentially of the school of Napoleon, he rejected the *a priori* reasoning of the Germans, and while recognizing the value of organization made it always subordinate to strategy. While the Ger. system took no account of the human factor in warfare and aimed at the creation of a perfect machine, Foch was a great leader of men. His guiding strategical maxim was, 'to hold positions is to prepare implicitly for defeat if nothing further is attempted and the offensive is not immediately assumed.'

FOCHABERS (57° 37′ N., 3° 5′ W.), village, Elginshire, Scotland, near mouth of Spey; near it is Gordon Castle.

FOCSANI (45° 47′ N., 27° 15′ E.), town, Putna, Rumania; grain, wine; fortification works. Pop. 25,300.

FOCUS. See LENS.

FODDER, food of herbivorous domestic animals; term generally used for dried grass—hay and straw—and Leguminosæ—beans, peas, clover, tares, etc.

FOG, water dust suspended in the atmosphere close to the earth, depends on the solid matter in the air. If the air is free from dust the temperature may be below dew-point, but no drops of water will form, for as soon as water is present it will evaporate. But if particles of dust are present the water condenses on them as a thin film, from which re-evaporation does not take place readily. The water is probably produced in favorable sites by the movement of masses of moist air at different temperatures. In the country, f. is usually white, and consists of minute water-globules which disperse the sunlight by repeated reflection, but it is fairly translucent. In the town, soot and smoke blacken it, so that light may be quite obscured. The presence of f. in the air decreases the velocity of sound.

FOG SIGNALS, audible warnings used at sea and on railways. International law decrees that ships in fog must give warning of their approach by siren (steamship), by fog-horn (sailing ship). Ships at anchor give warning by bell. Wireless telegraphy is now used to some extent for giving ships their position at sea. On railway lines detonators are laid, and explode on contact with the engine wheels.

FOGARAS (45° 47′ N., 24° 54′ E.), capital, F., Hungary. Pop. *c.* 5,000. The province has area of 725 sq. miles. Pop. *c.* 88,000.

FOGARTY, THOMAS (1873), Illustrator. Born in New York; studied at Art Students League, New York. Was illustrator for magazines and leading periodicals. In 1896 he illustrated his first book. In 1900 illustrated *Sailing Alone Around the World*; 1901, *The Making of an American*; 1902, *The Battle with the Slum*; 1903, *The Forest*;

1904, *Tommy and Company*; 1907, *The Blazed Trail*; in 1911, *Adventures in Friendship*. Member Society of Illustrators. Was teacher of illustration at Art Students League.

FOGAZZARO, ANTONIO (1842-1911), Ital. poet and novelist; author of *The Saint*.

FOGGIA (41° 27′ N., 15° 31′ E.), town (ancient *Arpi*) and episcopal see, Foggia, Italy; agricultural produce. Pop. 79,500.

FOIL. See FENCING.

FOIL. See GOLD LEAF.

FOIX (42° 57′ N., 1° 36′ E.), formerly capital of Foix County, now capital of Ariège, on river Ariège. Near it is an old castle belonging to Counts of Foix. F. has iron and steel works. Pop. 7,000.

FOIX, Fr. family which took title of count from F. district; Raimond Roger (*d. c.* 1223), famous as Crusader and in Albigensian movement. Gaston IV. (*d.* 1472), *m.* heiress of Navarre, and was named successor by her father, John II. Gaston (1489-1512), 'The Thunderbolt of Italy,' was slain at Ravenna, and Navarre was divided by France and Spain.

FO-KIEN. See FU-KIEN.

FOKKER, A. G. H., Dutch aeroplane inventor; built the famous Fokker for Germans; retired to Holland, and his Ger. property was seized, Sept. 1919, as security against export of capital from Germany; in Sept. 1919 announced the invention of a wireless-directed bomber; has recently designed a machine without struts or wires.

FOLARD, JEAN CHARLES (1669-1752), Fr. soldier and writer; served in Italy, 1702-5; at Malplaquet, 1709; in Malta, 1714; Spain, 1719; gov. of Bourbourg, 1711; wrote *Essays on War*.

FOLEY, JOHN HENRY (1818-74), Irish sculptor; exhibited *Death of Abel* and *Innocence*, 1839. His *Youth at the Stream*, 1844, led to commissions for the statues of *Hampden* and *Selden* for Houses of Parliament; R.A. 1858. Amongst his better-known statues are those of *Goldsmith* and *Burke* (in front of Trinity Coll., Dublin), *Prince Consort* (Hyde Park), and *Sir Charles Berry* (Westminster). His *Lord Hardinge*, *Lord Canning*, and *Sir James Outram* are in India.

FOLD, in geology, a bend or curvature in the stratified rocks composing the earth's crust. F's are often best seen where strata is exposed, such as in cliffs on the seashore or in quarries. F's are due to upheavals, caused by earthquakes, or to pressure, whereby the earth's crust is so moved as to fold over. They are of two kinds, simple and complex. In the latter case a simple fold may be further folded. Fine examples are found in the Alps.

FOLGER, CHARLES JAMES (1818-1884), an American jurist and ex-Secretary of the U.S. Treasury, *b.* in Nantucket, Mass. He graduated from Geneva (now Hobart) College, in 1836, began to practice law and in 1871 was elected associate judge of the New York Court of Appeals, becoming chief justice in 1880. In 1881 he was appointed Secretary of the U.S. Treasury. In 1882 he was the Republican candidate for Governor of New York, but was defeated by Grover Cleveland.

FOLGER, WILLIAM MAYHEW. (1844), Rear-admiral United States Navy. Born in Ohio. In 1864 graduated from United States Naval Academy. Had various promotions from ensign in 1866 to Rear-Admiral in 1904. From 1864-1865 served on receiving ship 'North Carolina.' 1865-68 was on 'Hartford,' of the Asiatic Squadron. 1868-72 was on 'Franklin.' 1872-75 did ordnance duty. 1877-78 ordnance duty at Navy Yard, Washington. 1878-79 was at Naval Academy. 1882 at Bureau of Ordnance. 1882-1885 ordnance duty Naval Academy 1887-88 Commanded the 'Quinnebaug.' From 1890-93 chief Bureau of Ordnance with rank of Commodore. 1898-99 commanded 'New Orleans.' 1899-1900 was general inspector of 'Kearsage.' 1900-01 commanded the 'Kearsage.' Retired, June 1905.

FOLIATION, in geol., parallel layers of different minerals; found in schists and gneisses.

FOLIGNO (42° 57′ N., 12° 43′ E.), town (ancient *Fulginia*) and episcopal see, Perugia, Italy; silks, woolens. Pop. 9,500.

FOLIO, page in a ledger; printer's term for sheet folded once; book containing such sheets; the page number of a book.

FOLK, JOSEPH WINGATE (1869-1923), an ex-governor of Missouri, *b.* in Brownsville, Tenn. Graduating from Vanderbilt Univ., in 1890, he began to practice law in his native city, removing to St. Louis, Mo., in 1894. As circuit attorney for that municipality, during 1900-4, he exposed a great deal of official and political corruption, prosecuting a number of bribery cases which attracted wide attention. On the strength of the record he thus made, he was elected governor of the state of Missouri for the term 1905-9, on the Democratic ticket. During his term in office he gained national attention by the large amount of progressive legislation which he initiated.

FOLKESTONE (51° 5′ N., 1° 11′ E.), seaport, watering-place on English Channel, Kent, England; has fine harbor, esplanade; fisheries; terminus of steam-packet route to Boulogne. Pop. 1921, 36,876.

FOLKLAND, A.-S. term for land held by custom, or without documentary title.

FOLK-LORE. The science of Folk-lore is defined as 'the comparison and identification of the survivals of archaic beliefs, customs, and traditions in modern ages.' For scientific purposes, folk-lore may be defined in wider terms as traditional literature, beliefs, and practices current among peoples in all stages of culture, and the science of folk-lore as the science of tradition. So defined, the subjects of folk-lore may be divided into three classes—viz., (1) religion, (2) social institutions, (3) amusements and culture; but it is impossible to draw a rigid line of distinction between these. It is the business of the science of folk-lore to compare items of traditional belief, practice, and literature in different and frequently widely separated countries, and to determine, if possible, their origin and primitive intention. On such an investigation being made it is found that there are few of the beliefs and observances traditional among the peasantry of Europe that are not traceable to a religious source. Thus the nursery and fairy tales of Europe are found to belong in large part to a common stock, many of them being found practically all over the world, and are obviously sprung from similar processes of thought and similar conditions of human society. Famous collections of such folk-tales are Ovid's *Metamorphoses* and the *Arabian Nights Entertainments.*

The earliest writer to collect folk-lore systematically was John Aubrey, 1626-97, portions of whose work were incorporated by Brand in *Observations on Popular Antiquities,* 1811. Percy's *Reliques,* 1765, stimulated the study of the customs and superstitions in ballad literature, but the first scientific collection of folk-tales was that of the brothers Grimm, who set down what they heard exactly as they heard it. Their results were published in a series of volumes from 1812 to 1822. Jacob Grimm's *Deutsche Mythologie,* 1835, still remains an authority for anc. Teutonic mythology and religious practices. Darwin's *The Origin of Species,* 1859, gave a fresh impetus to the study in England, the chief results of which were E. B. Tylor's *Researches into the Early History of Mankind,* 1865, and *Primitive Culture,* 1871, which placed the inquiry into the psychological development of mankind on a thoroughly scientific basis.

FOLLEN, ELIZA LEE (CABOT) (1787-1860), an American writer, *b.* in Boston, Mass. She was the wife of Prof. Charles Theodore Follen, and was prominent as an advocate of the abolition of slavery and a writer of verse. She wrote *Well-Spent Hours,* 1827; *Poems on Occasional Topics,* 1839; *To Mothers in the Free States,* 1855, and *Anti-Slavery Hymns and Songs,* 1855

FOLLICLE, see SKIN.

FOMENTATION, application of warm fluid to part of body so as to relieve pain; generally of flannel soaked in boiling water, and covered with waterproof.

FOND DU LAC, a city of Wisconsin, in Fond du Lac co., of which it is the county seat. It is on the Chicago, Milwaukee and St. Paul, the Chicago, Northwestern, and the Minneapolis, St. Paul and Sault Ste. Marie railroads, and on the Winnebago Lake, at the mouth of the Fond du Lac river. It is 60 miles N.W. of Milwaukee. The city has connection by steamboat with all the Great Lakes. Its manufactures include the making of engines, machinery, flour, paper, carriages, lumber, typewriters, drugs, candies, etc. It has a high school, St. Agnes hospital and sanitarium, a court-house and Grafton Hall, a private school. Pop. 1920, 23,427.

FONDI (41° 21′ N., 13° 27′ E.), town, ancient *Fundi,* Caserta, Italy; cathedral; monastery in which Thomas Aquinas taught; taken by Turks, XVI. cent. Pop. 10,000.

FONSAGRADA (43° 7′ N., 7° 6′ W.), town, Galicia, Spain; flour-mills. Pop. 17,000.

FONSECA, BAY OF (13° 10′ N., 87° 45′ W.), inlet of Pacific, bordering Honduras, Salvador, and Nicaragua, Central America.

FONSECA, MANOEL DEODORO DE (1827-92), Brazilian soldier and statesman; led successful insurrection in Brazil and proclaimed republic, 1889, and became first pres. 1891.

FONT, receptacle for holding water used in baptismal rite; generally made of stone, though some bronze and leaden examples have been found; took place of earlier baptisteries, few of which were built after IX. cent.; early mediæval f's were generally circular in form; at later date octagonal shape became more frequent, while some square examples also occur.

FONTAINE, JEAN DE LA, see La Fontaine.

FONTAINEBLEAU (48° 24′ N., 2° 42′ E.), town, Seine-et-Marne, France; surrounded by picturesque forest; favorite resort of Fr. landscape painters; magnificent palace, from Middle Ages to abdication of Napoleon in 1814 one of chief residences of kings of France; revocation of Edict of Nantes signed here, 1685; sandstone quarries; porcelain. Pop. 14,200.

FONTANA, DOMENICO (1543-1607), Ital. architect; builder of the Vatican Library and Quirinal.

FONTENAY-LE-COMTE (46° 28′ N., 0° 48′ W.), town, Vendèe, France; suffered in Huguenot and Vendean wars; textiles. Pop. 8,000.

FONTENELLE, BERNARD LE BOVIER DE (1657-1757), Fr. man of letters; a voluminous writer, best known works being *Entretiens sur la Pluralite des Mondes* and *Histoire des Oracles*; sec. of Académie française, where he pronounced famous *Eloges*.

FONTENOY (50° 34′ N., 3° 30′ E.), village, Belgium, near Tournai, province of Hainault; site of fierce battle, 1745, during War of Austrian Succession, between French commanded by Marshal Saxe and British, Austrians, Dutch, and Hanoverians under Duke of Cumberland, George II.'s *s.* Object of allies was to relieve fortress of Tournai held by French. Success of British at beginning due to celebrated attack by Cumberland; finally allies were forced to retreat.

FONTEVRAULT (47° 11′ N., 0° 3′ E.), town, Maine-et-Loire, France; has celebrated XI.-cent. abbey, destroyed during first revolution, now a convict prison.

FONTINALIS, genus of mosses, Greater Water-Moss (*F. antipyretica*). being incombustible, is used for lining woodwork near chimneys.

FOO-CHOW. See Fu-chow.

FOO-SHAN. See Fu-shan.

FOOD, the material taken into the body in order to preserve life, and for the purpose of the growth and repair of the tissues. It ought to contain proteins, carbohydrates (starch, sugar, and gum), fats, certain mineral salts, and water, and these substances are obtained from various sources. Meat has about 20 per cent. of protein, a varying percentage of fat, the greater part, usually over 70 per cent., being water. Grains, wheat, barley, etc., contain starch, and also a small amount (7 to 11 per cent.) of protein, and when made into bread contain about 40 to 51 per cent. of carbohydrates, whole-meal bread sometimes containing a higher percentage of proteins than white bread. Oats, maize, and rye contain more fats than other grains, while rice has very little fats or protein. Beans, peas, and lentils have a large percentage of protein, and form a very nutritious food. Potatoes contain much starch, but very little proteins or fats, and should be combined with foods containing these substances. Vegetables and fruits are chiefly valuable for the salts and acids they contain. Milk is the most nutritious beverage, containing all the necessary food substances, and infants obtain absolutely all the nutrition required from human milk. Tea, coffee, and cocoa are stimulants only, and have no nutritive value; while alcohol, especially in the form of beer and porter, is slightly nutritive as well as stimulating, but, in large quantities, has a depressing and even dangerous action.

Food Preservation has been practiced by man in different forms since a primitive stage of civilization, drying and salting the flesh of animals, preserving fruit juices by fermenting them into wines, and drying and pressing milk into cheese being well-known methods in very early times. It is only within recent times, however, that the reasons for, and the principles of, food preservation have been really understood, for it is only since the middle of the 19th cent. that it has been known that the decomposition of foodstuffs is not due to any property of the actual substances themselves, but to the action upon them of invading organisms. The modern methods are, therefore, directed towards preventing the presence or destroying the life of such organisms, a variety of different systems being employed.

The most general method is that invented by François Appert, which consists in packing the food to be preserved in *cans*, usually made of sheet steel with a thin layer of tin upon it, immersing them in a solution, and then sterilizing them by exposure to steam at a high temperature, the lid, and any hole which has been made to allow of the escape of the heated air, being closed with solder. Meats of different kinds, and fruits in syrup are preserved in this way. Fruit may also be preserved by boiling in syrup and then drying (*candied* fruits), or by boiling with an equal weight of sugar until it breaks down slightly, both methods depending on the fact that sugar in solution has a bactericidal action; or the fruit may simply be heated in water of a sufficient temperature to effect sterilization in vessels which are then carefully closed so as to shut out air. Fruits—(*e.g.*) grapes, plums, apples—and also vegetables, are excellently preserved by *drying*.

Salt is a fairly good preservative for meats, etc., but its taste is always very evident; while boracic acid, salicylic acid, and other chemical antiseptics are also becoming much used, but, while efficient preservatives, their effect on the consumer is injurious. The drying of meats is a method hardly practiced at all now, except a few instances abroad—(*e.g.*) biltong, a species of sun-dried meat in S. Africa. Fish is dried, and sardines and other fish are preserved by packing them in oil; eggs, by submerging them in water-glass or lime water; and milk, either by heating to such a temperature as will kill any organisms it contains or by evaporating it down to a viscid consistency either with or without the addition of sugar, and packing in tins, or by drying to a powder.

Refrigeration is a valuable method widely adopted today in preserving food, as organisms are unable to grow at a temperature below the freezing-point of water, and enormous quantities of meat—beef, mutton, etc.—fish, eggs, and fruit are imported frozen from Australia, New Zealand, the W. Indies, and other countries, and kept in this state till required. See ADULTERATION OF FOOD.

FOOD, HEAT OF. See CALORIES.

FOOD INSPECTION. See ADULTERATION OF FOOD.

FOOD SUPPLIES. See AGRICULTURE.

FOODS, DESICCATED. Neither molds nor bacteria will grow in the absence of moisture. This is particularly true of bacteria which require from 25% to 30% of moisture in a substance before they will multiply in it. The drying of foods is therefore, the oldest and most widely used method of preservation. Nature herself uses the method for the preservation of the seeds of plants, the ripe seed being dried in the sun until it is so low in moisture that it will no longer decay. The preservation of many important foods by desiccation occurs, therefore, naturally as in the case of corn, wheat, and other grains, and the flour made from them. These flours, when mixed with water, rapidly putrefy, and even when cooked and partially re-dried, as in the case of bread, they produce mold growth, but when well dried, as in the case of crackers, they will keep indefinitely. This method of preservation has been adapted by man to many varieties of foods. Meat of different kinds is dried by frontiersmen and uncivilized races and the resulting pemmican, as it is called, can be kept for months with no sign of decay. A combination of drying and salting is very common, thousands of tons of dried meat being prepared annually in South America and shipped all over the world. Hams and bacon and other smoked meats are preserved by a combination of drying, salting, and smoking. Fish of various kinds, such as haddocks, herrings and salmon, are preserved by drying, and among the more recent animal foods treated by this process are milk and eggs. Vegetable foods of many kinds have been dried for centuries. Raisins (dried grapes), prunes (dried plums), currants, apples, pears, figs, apricots, peaches and many others are successfully dried, and during recent years much attention has been given to improving the equipment used for desiccation. Drying in vacuo at comparatively low temperatures has met with considerable success, and by this method almost all the common vegetables, both leaf and root, have been dried for preservation.

FOOL, professional or court jester, or buffoon. Such jesters were employed amongst the ancient Greeks, and they were to be found at most European and Eastern courts during the Middle Ages and down to comparatively modern times. The f.'s dress was particolored; he wore a close-fitting hood decorated with a cockscomb upon his shaven head, and carried a 'bauble' in his hand.—The Feast of Fools was a mock-religious observance in the Middle Ages, probably derived from Rom. *Saturnalia*. It reached its greatest development in the XI. and XII. cent's, when the choir-boys used to elect one of their number as bp., go to church, and hold a mock service; these customs lasted till the XVI. cent. (later in France).

FOOT, the end portion of the leg, upon which animals rest when standing or walking; in man, more particularly, that part of the lower limb beyond the ankle. There are certain superficial landmarks which may be noted. At the inner side of the ankle the internal *malleolus*, part of the tibia, may be easily felt, while at the outer side, slightly farther back and lower, is the external malleolus, part of the fibula. Behind the malleoli on either side tendons are seen passing from the muscles on the leg above to the foot, the most noticeable being the *tendon Achillis* passing to the back of the heel. On the front of the foot a nerve may be made out, the *musculo-cutaneous* nerve, beneath the skin, which goes to the toes, and a venous arch also passes across the front, conveying the blood from the foot to the superficial blood-vessels of the leg.

The ankle joint is formed by the tibia and fibula of the leg and the *tarsal bones* of the foot. The tarsal bones are seven in number, roughly of a cubical form, the uppermost, or *astragalus*, articulating with the leg bones, below it being the *os calcis* or heel bone, and in front the *scaphoid*. In front of the scaphoid are three wedge-shaped bones, the three *cuneiforms*, and to their outer side, in front of the os calcis, is the *cuboid*.

In front of the last four, which are in a more or less regular row, are five long *metatarsal* bones, and each metatarsal has in front of it three *phalanges* (in the great toe, two only) or bones of the toes. Between each of the bones are surfaces covered with cartilage, forming slightly movable joints, and the bones are strongly bound to one another by ligaments, whole tendons from the muscles of the leg come round the bones to be attached at different points, and also serve to assist in holding them in place.

The movements of the foot are brought about by the muscles of the leg, the tendons of which act upon the different bones of the foot to which they are attached. The muscles of the calf are attached to the os calcis by the strong tendon Achilles, while from other muscles on the back of the leg come one tendon attached to the scaphoid, and another which is attached below the great toe and makes it turn upwards, those tendons passing on the internal side of the leg. On the external side there is a tendon which goes to be attached to the outer metatarsal bone, and another which runs across the sole of the foot to be attached to the metatarsal bone of the great toe. On the front of the foot there are five tendon slips coming to the different toes from a muscle on the front of the leg, the action of which is to make them turn downwards, while there are also four slips from a little muscle which springs from the os calcis, which assist in the same movement. It is by the combination of the actions of these tendons controlled by the muscles of the leg that the harmonious movements of the foot are brought about.

FOOT. See WEIGHTS AND MEASURES.

FOOT-AND-MOUTH DISEASE (*Aptha epizootica*), an acute contagious disease of animals, which attacks cattle, sheep, pigs, and goats; characterized by the appearance of little blisters on the mouth, lips, and tongue, the heels, coronets, and interdigital spaces of the feet, and on the udder, with some fever, running a course of eight or ten days. Soft, easily digested food, salines or other laxatives are given, and mild antiseptics and astringents (*e.g.*) alum, zinc oxide—applied to the affected parts. The animals attacked are either isolated or destroyed.

FOOTBALL. This game, brought by the Romans into Britain, and thence carried to America, is chiefly fostered by the colleges, which have developed a modern sport known as American Intercollegiate Football. Its forerunners, British Association and Rugby, are not wholly neglected, but their followers relatively are not large. The college games reign supreme, and it is to them that the great American football public extends its chief support, so much so that intercollegiate events have become the most lucrative form of university and college athletes and support other branches of college sports which have a less popular appeal.

The game is played in a field between two contesting teams, each of which seeks to kick or convey the ball across the goal line of the opposing side. Every season produces its record throngs, and the enormous stadiums frequently cannot accommodate the crowds that flock to them. It was the introduction of the 'forward pass' in 1906 that stimulated the popularity of Intercollegiate. Its adoption produced 'open play,' which heightens the spectator's interest, and also enables elevens from smaller institutions to meet leading college teams with a reduced handicap. The game is supervised by four officials. A referee watches the course of the ball. Two umpires look to the conduct of the players, while a linesman acts both as a third umpire and ir helping the referee in time-keeping and measurements.

The leading events are the games between the Army and Navy and between the leading college teams, which include Harvard, Yale, Princeton, Cornell, Pennsylvania, Lafayette, Iowa, Michigan, California, Chicago, Wisconsin, Minnesota, Illinois, Northwestern, Ohio State, Indiana, Purdue, Brown, Bucknell, Centre, Columbia, Dartmouth, Georgia, Lehigh, Notre Dame, Pittsburgh, Stanford, Syracuse, Virginia, Washington and Jefferson, Washington, and Williams.

Rugby has some vogue in the Middle West but makes little appeal in the East. Association has its national body (which awards a challenge cup emblematic of national championship) and its Soccer League, comprised of eight clubs representing New York, Brooklyn, Harrisburg, Philadelphia, Jersey City, Fall River, Holyoke and Pawtucket.

The modern game of football as played by American colleges was introduced in 1876 by Harvard, which brought Rugby from Canada, after playing a game there. Rugby was duly displaced by the development of Intercollegiate on lines that departed widely from the parent game.

FOOTE, ANDREW (1806-1863), rear-admiral; *b.* New Haven, Conn. He studied at West Point and in 1822 entered the Navy, becoming a lieutenant eight years later. As commander of the brig *Terry*, 1849-51, he took an active part in suppressing the slave trade on the African coast, and recorded his experiences in *Africa and the American Flag.* Subsequently, in the course of hostilities between England and China, 1856, he was in Chinese waters in command of the *Portsmouth* and sought to protect American property on the Canton river, whereupon the Chinese fired upon him. An apology not being forthcoming, he stormed and captured four of their forts. He served, 1858-61 as commandant of the Brooklyn Navy Yard after this exploit. In the Civil War he commanded a fleet of gunboats, captured Fort Henry and tried to take Fort Donelson, where he was wounded, before it surrendered to Grant. He relinquished his command in 1862 owing to his wound, and died after being chosen to command the fleet at Charleston, in succession to Admiral Dupont.

FOOTE, ARTHUR (1853), American musician. *b.* at Salem, Massachusetts; Bachelor of Arts, 1874; and Master of Arts 1875 of Harvard College; musical education under Professor John K. Paine and B. J. Lang. Was organist and teacher of pianoforte playing. 1878-1910 was organist at First Unitarian Church, Boston. Has composed music for quartets, trios and orchestras. Also cantatas for orchestras and chorus, songs, anthems and organ pieces. Member of National Institute Arts and Letters, Harvard Musical Association.

FOOTE, MARY HALLOCK (1847), novelist and artist; *b.* Milton, N.Y. In 1876 she married Arthur D. Foote, a mining engineer, and thereafter obtained an intimate knowledge of Western mining districts. Her illustrative work included elaborate drawings for selections of Longfellow's poems. Her chief novels and shorter fiction, which contain vivid pictures of Western and Mexican life, embrace thirteen books published between 1883 and 1919. In the latter year the *Ground Swell* appeared.

FOOTE, SAMUEL (1720-77), Eng. actor and dramatist; *b.* Truro; ed. Oxford; after squandering two fortunes, went on stage; first essayed tragedy, then genteel comedy; eventually achieved success by marvellous powers of mimicry; wrote a considerable number of plays very popular in their day, such as *The Liar*, *The Mayor of Garratt*, *The Devil on Two Sticks*, *The Nabob*, and *The Capuchin*; appears to have been devoted to Garrick, although his rival, and was famed for wit, repartee, and kindliness of disposition.

FOOTSCRAY (37° 47′ S., 144° 56′ E.), city, Victoria, Australia; 4 miles W. of, and suburban to, Melbourne; stone quarries. Pop. 18,000.

FOOTWEAR. See Boots and Shoes.

FORAKER, JOSEPH BENSON (1848-1917), statesman and lawyer; *b.* Highland County, Ohio; *d* Cincinnati. In his teens he took part in the Civil War, joining an Ohio infantry regiment of volunteers in which he served till the war's close, when he was brevetted captain. Afterwards he studied law at Cornell, graduating in 1869. Opening a practice at Cincinnati, he became of note as a corporation lawyer. He was elected judge of the Superior Court at Cincinnati in 1879, serving till 1882, when he was nominated as Republican candidate for the Ohio governorship, but was defeated. Two years later he was renominated for that office, won the election, and was reelected in 1887. He failed to secure a third term in 1889 and resumed his law practice. In 1879 began his emergence as a national figure by his election to the United States Senate, serving till 1909. He had previously been prominent at national Republican conventions. In 1896 he proposed McKinley for the Presidency, and again in 1900. His political career was affected by his conflicts with President Roosevelt, whose so-called radical policies he opposed in the Senate, especially railroad legislation and other anti-corporation measures. The climax came in 1909, when disclosure of correspondence with the Standard Oil Company, showing that he received retainers from that corporation while in office, forced his withdrawal from public life. In 1914 he sought exoneration of charges made against him before a Senate committee by reappearing as a candidate for Senator from Ohio, but was defeated by Senator Warren G. Harding. The law occupied the remaining years of his life.

FORAMINIFERA, a group of unicellular animals, the vast majority of which are marine, characterized by the possession of a simple or elaborate test or shell, which may be of a calcareous, or arenaceous, but never of a siliceous nature, penetrated or enveloped by delicate protoplasmic processes, which branch and anastomose freely (*c*. *Heliozoa*). The shells, which are extremely variable in character, are always primarily single-chambered, and from this starting-point, a closely coiled spiral, a globular mass, a chain-like series, and many other forms may be evolved.

FORBACH (49° 11′ N., 6° 53′ E.), town, Alsace-Lorraine, Germany; pottery; coal mines. Pop. 10,000.

FORBES, ALEXANDER PENROSE (1817-75), Scot. Anglican ecclesiastic; associated with the Puseyites.

FORBES, ARCHIBALD (1838-1900), Brit. journalist; noted war correspondent in Franco-Ger. War, 1870-71; Carlist War, 1873; Russo-Turkish War, 1877; Zulu campaign, 1879.

FORBES, DUNCAN, OF CULLODEN (1685-1747), Scot. judge and politician; prominent anti-Jacobite; supported Government in 1715 and 1745; Lord Advocate, 1725; pres., Court of Session, 1737.

FORBES, EDWARD (1815-54), Brit. botanist; prof. of Bot., King's Coll., London, 1842; pres., London Geological Soc. 1853; Natural History prof., Edinburgh Univ. 1854.

FORBES, JAMES, playwright *b.* in Canada. Educated at Collegiate Institution of Galt, Ontario. Became a naturalized citizen of the United States in 1892. Was assistant dramatic editor of the New York World and dramatic critic of Pittsburgh Dispatch, 1897-98. From 1898-1902 was press representative of various publications. Since 1906 has been playwrighting. Directed groups of professionals to entertain soldiers of the American Expeditionary Forces in Europe. Member of Author's League of America, Dramatists Guild, Society of American Dramatists and Composers. Author of *The Chorus Lady*, 1902; *The Traveling Salesman*, 1908; *The Commuters*, 1910; *A Rich Man's Son*, 1912; *The Show Shop*, 1914; *The Famous Mrs. Fair*, 1919. Some of his plays have appeared in book form. Writes for magazines.

FORBES, WILLIAM CAMERON (1870), administrator and banker; *b.* Milton, Mass. He was educated at Milton Academy and at Harvard, from which he graduated in 1892. He entered business, learning banking, and became connected with a number of corporations both as executive and director, among them the banking firm of J. M. Forbes & Co., of Boston, which he entered as a partner in 1899. In 1904 President Roosevelt appointed him a member of the Commission governing the Philippine islands, where he acted as Secretary of Commerce and police till 1908, when he was appointed vice-governor of the islands. Under the Taft administration he became governor-general, serving from 1909 to 1913. In 1920 he published a book on polo for private circulation and in 1921 *The Romance of Business*.

FORBES-ROBERTSON, SIR JOHNSTON (1853), Brit. actor; played with the Bancrofts, Hare, Modjeska, Irving, and Mary Anderson. Began management on his own account 1895, playing Romeo to the Juliet of Mrs. Patrick Campbell; produced *Hamlet* with great effect, 1897. In Jerome's *Passing of the Third Floor Back* he had extraordinary success both in Britain and America.

FORBIDDEN FRUIT, ADAM'S APPLE, fruit of citrus. *Citrus Medica* has 'tooth-marks' in its rind.

FORCE. See Dynamics; Energy.

FORCEPS, scissor-like instrument with flattened or expanded ends, used in surgery, dentistry, etc., or for any delicate work where objects are too small or inconvenient to handle.

FORCING, process by which plants, etc., are artificially matured; consists in growing them in hot-houses either for whole or part of growth.

FORD, HENRY (1863), an American manufacturer of automobiles, *b.* in Greenfield, Mich. With very little schooling, he began his career as a machinist's apprentice, later rising to the position of chief engineer of the Edison Illuminating Co. It was in 1903 that he organized the Ford Motor Co. and as its president and majority stock holder, guided that corporation to its present position of the largest automobile manufacturing firm in the world. Through his executive genius Mr. Ford by the economies of large-scale production, was able to reduce the price of automobiles to such a low figure that it became attainable by every citizen of average means. In 1922 his plant was employing 75,000 persons and was turning out about 3,500 automobiles a day. Aside from his success as a manufacturer, Mr. Ford also attracted national attention by his methods as an employer of labor, showing that low prices of his output was not incompatible with a high standard of wages. In 1914 he announced and put into practice a plan for profit-sharing which involved the distribution of from ten to thirty millions of dollars a year among his employees. By his attitude toward his many employees Mr. Ford has put himself in the unique position of being at the same time at the head of an open-shop establishment and also regarded as a friend by organized labor. In 1918 he was induced by the Democratic party of his state to run for U.S. Senator, his opponent being Truman H. Newberry. The allegation was later made that Mr. Ford was defeated by the corrupt practices of his opponent, but although the investigation instituted by the U.S. Senate failed to uphold these charges, Mr. Newberry was nevertheless compelled to resign.

FORD, HENRY JONES (1851), college professor and author; *b.* Baltimore. After graduating from the Baltimore City College in 1868 he entered journalism, remaining in that profession until 1906. During this period he was city editor of the *Baltimore Sun*, managing editor of the *Baltimore American*, then joined the *New York Sun* and filled executive editorial posts on the *Pittsburgh Commercial Gazette, Chronicle Telegraph* and *Gazette*. In 1906 he became identified with university work as a lecturer at Johns Hopkins University and at the University of Pennsylvania, and two years later was appointed professor of politics at Princeton. Political science forms the subject of most of his writings, which include *The Rise and Growth of American Politics*; *The Natural History of the State*; *Woodrow Wilson: The Man and His Work*; *Washington and His Colleagues*, 1918; *The Cleveland Era*, 1919; and *Alexander Hamilton*, 1920.

FORD, JAMES LAUREN (1854), American author. *b.* n St. Louis, Missouri. Author of *The Third Alarm, Dolly Dillenback, Dr. Dodd's School, The Literary Shop, Bohemia Invaded, Hypnotic Tales, The Brazen Calf, Cupid and the Footlights, Every Day in the Year, The Wooing of Folly, The Great Mirage*, 1915. In 1921 *Forty Odd Years in the Literary Shop*. Was editor of the Porcupine, 1917-18.

FORD, JOHN (1586-*c.* 1640), Eng. dramatist; *b.* Ilsington, Devon; ed. Oxford; studied law, but eventually devoted himself solely to dramatic authorship. In his choice of subjects F. was sometimes abnormal, and there is much that is repulsive in his plays, but they are distinguished by great intensity of passion and literary quality of a very high order. His plays include *'Tis Pity She's a Whore, The Lover's Melancholy*, and *Perkin Warbeck*; author, with Dekker and Rowley, of *The Witch of Edmonton*.

FORD, PAUL LEICESTER (1865-1902), author and editor; *b.* New York; *d.* there. His writings were largely historical and biographical, interspersed with volumes of fiction. He wrote works on Washington and Franklin, edited the writings of Jefferson, compiled a bibliography of the literature created by the adoption of the Constitution, and founded and edited *The Bibliographer*. His novels included *The Honorable Peter Stirling*. He was fatally shot by his brother Malcolm in a quarrel over the inheritance of their father's estate.

FORD, RICHARD (1796-1858), Eng. traveler and author; wrote Murray's *Handbook to Spain*.

FORD, SEWELL (1868), American Author. Born in Maine. In 1887 graduated from Haverhill High School. Author of *Horses Nine*, 1903; *Truegate of Mogador*, 1906; *Shorty McCabe*, 1906; *Side-Stepping with Shorty*, 1908; *Cherub Divine*, 1909; *Just Horses*, 1910; *Torchy*, 1911; *Odd Numbers*, 1912; *Trying out Torchy*, 1913; *On with Torchy*, 1914; *Shorty McCabe on the Job*, 1915; *Torchy, Private Secretary*, 1916; *Wilt Thou, Torchy*, 1917; *Torchy and Vee*, 1918; *Shorty McCabe looks 'em Over*, 1918; *Shorty McCabe Gets the Hail*, 1919; *Meet 'em with Shorty McCabe*, 1921; *Inez and Trilby*, 1921. Writes for magazines.

FORD, WORTHINGTON CHAUNCEY (1858), author and editor; *b.* Brooklyn, N.Y.; brother of Paul Leicester Ford. He was educated at the Brooklyn Polytechnic Institute and Columbia University. He entered the government service and was chief of the bureau of statistics, Department of State, from 1885 to 1889 and occupied a similar post in the Treasury Department from 1893 to 1898. He then became identified with library work at the Boston Public Library till 1902, and at the Library of Congress till 1909 as chief of the manuscripts division. As editor of the publications of the Massachusetts Historical Society from 1909 he produced numerous brochures on revolutionary history and the leading figures therein, and on the political and literary history of the Bay State. He edited the writings of Washington and John Quincy Adams and the journals of the Continental Congress. His later works include *The Treaty of Ghent*, 1915, and 1920, *Some Papers of Aaron Burr*; *A Cycle of Adams Letters*; and *The Isle of Pines*; an essay on bibliography.

FORD CITY, a borough of Pennsylvania, in Armstrong co. It is surrounded by an important agricultural and coal mining region. Its chief industry is the manufacture of plate glass. Pop. 1920, 5,605.

FORDE, FRANCIS (*fl.* 1746-70), brilliant Eng. leader, under Clive, in India.

FORDHAM UNIVERSITY, a Roman Catholic seat of learning situated in Fordham, New York. It was founded by the late Archbishop Hughes as St. John's College, and opened in 1841. Administered by the diocesan clergy till 1846, it was then acquired by the Society of Jesus (Jesuits). Its educational scope became enlarged by legislative authority to bestow degrees in theology, arts, law and medicine. Later schools of law, medicine, pharmacy, sociology and social service were added. In 1907 the institution became Fordham University, absorbing St. John's College as the collegiate department. The university is housed in ten imposing buildings occupying grounds that cover about 70 acres and partly bounded by Bronx Park. In 1922 the student roll numbered 3,500 and there were 100 professors under the presidency of the Rev. E. P. Tivnan.

FORDUN, JOHN OF (XIV. cent.), Scot. chronicler; his *Scotichronicon* covers Scot. history till 1153; left materials for further volumes, which Walter Bower of Inchcolm brought down to 1437; chief authority on early Scot. history.

FOREIGN COINS, VALUE OF. See Coins, Foreign, Value of.

FOREIGN LEGION (*Legion etrangere*), force of two infantry regiments, each of four battalions, in Fr. army, formed of men who are not Fr. subjects, though all the superior officers and most of the company officers are Frenchmen. Men who enlist are asked no questions as to previous record; Legion includes adventurous spirits or deserters from other armies, sometimes fugitives from justice; very strict discipline; has always fought well, and in World War lived up to its reputation. Trained in Algeria to make long and rapid marches.

FOREIGN OFFICE, Brit. administrative department which manages national relations with foreign countries; presided over by Sec. of State for Foreign Affairs; separate office established, 1782.

FOREIGN WARS, MILITARY ORDER OF, a patriotic society composed of descendants of officers who served in the Revolutionary War; the war with Tripoli; the War of 1812; and the Mexican War, 1847, and of officers who took part in the Spanish-American war of 1898; the China Relief Expedition of 1900 to help suppress the Boxer Rebellion; the Nicaragua campaign; the military operations in Mexico in 1916; and in American participation in the World War. The Order was founded in New York City in 1894. Its aim is to perpetuate the names and deeds of American heroes of war and the victories they helped to achieve, unite its members by ties of fellowship, develop military and naval science, and uphold the nation's honor, union and independence. It has a membership exceeding 6,000, distributed among national and state commanderies.

FORELAND, NORTH AND SOUTH (N.—51° 22′ N., 1° 26′ E.; S.—51° 10′ N., 1° 24′ E.), two headlands on coast of Kent, England, having Downs and Goodwin Sands between them; lighthouse on each.

FORESHORE, the stretch of coast comprised between high and low water mark at ordinary tides. The proprietary rights are vested in the Crown unless modified by local custom or by royal grant to a subject.

FOREST CITY, a borough of Pennsylvania, in Susquehanna co. It is on the Delaware and Hudson, the Erie, and the New York, Ontario and Western railroads. It is the center of an important agricultural region and has also extensive industries including coal mining and the manufacture of silk. Pop. 1920, 6,004.

FOREST PARK, a city of Illinois, in Cook co. It is a suburb of Chicago and is 4 miles beyond the city limits. It is on the Chicago, Great Western, Baltimore and Ohio, the Chicago Terminal, and other railroads, and on the Des Plaines River. Within its limits are several cemeteries. Pop. 1920, 10,768.

FOREST PROTECTION. See Conservation, Forestry.

FORESTERS, INDEPENDENT ORDER OF, a fraternal and benevolent organization, first formed in 1874 in Newark, N.J., and reorganized in Canada in 1881. Its headquarters are in Toronto. It issues insurance policies at a low cost and its funds are invested under the Canadian insurance laws. It also grants sick and funeral benefits and supports sanitariums for members who contract tuberculosis, as well as an orphanage for the children of deceased members. Its membership, which numbers 170,000 extends throughout Canada and Newfoundland, the United States, the United Kingdom, Europe, India and Australia.

FORESTRY. The term forestry should not be confused with arboriculture. The first is concerned with forests in mass, and the second with the care of separate trees. The conservation of forests includes protective measures against fires, re-forestation with young trees cultivated in nurseries to replace timber cut for fuel or manufacture; the preservation of areas around water-sheds to retain moisture, etc. In Europe the protection of forests dates back about a hundred years. Replanting began in Scotland in the beginning of the 18th century. France and Germany were among the first in Europe to adopt thorough measures for the protection of forests and established schools of forestry. American forests were once so vast that for many years the Government made no regulations to protect them. Devastating forest fires and reckless cutting of timber aroused the states to the need of making laws to stop abuses and bounties were given to encourage planting and taxes remitted on purely forest areas. The government tried to help by giving land to settlers if they planted a certain proportion in trees, but this law was repealed. A move in the right direction was the reservation of large areas around water-sheds and rivers. The United States forests cover about 550 million acres, or 29 per cent of the land surface. There are three great forest regions, one extending from the Atlantic seaboard to the Great Plains, the only timber being along streams and some heights, and two west of the Plains. White pine is the commonest tree and is most abundant in the northern part of the Lake States. In 1922 the net area of National Forest Lands was 156,837,282. Forests once covered 822 million acres and in 1922 there were 463 million acres, of this 137 million are virgin timber, 112 million culled and second growth, fit for sawing; 133 million, partially stocked with small growth and 81 million acres of devastated or waste lands. The United States uses four times the annual forest growth. The annual revenue for the fiscal year ending June 30, 1922, was $5,068,527. From 1916 to 1921 forest fires devastated over 66,000,000 acres. It is estimated that there are 2800 billion feet of lumber in the United states forests. One half is in the Pacific Northwest, and in Washington and Oregon in Idaho and Montana over one eighth; in California a little less. Of the varieties of pine Washington and Oregon supply one fourth (Douglas fir). Other pines, sold as 'Southern yellow pine' the Gulf and South Atlantic states, one-eighth; western Michigan one-eighth. Spruce, the next soft wood is found in the east and on western mountains. Hardwoods abound principally in northern parts of the east, producing about one-fifth of the supply. Alaska supplies western hemlock, Sitka spruce and yellow cedar. The Philippines contain 49,000,000 acres of timber of which 160 varieties are marketable woods. Hawaii and Porto Rico produce valuable hardwoods in great abundance.

FORESTRY ASSOCIATION, THE AMERICAN. This association was founded in Chicago in 1875, its purpose being to collect data about forests and forestry; to save existing forests and interest the general public in their preservation and secure legislation that will carry out far-reaching plans for forest conservation. In 1882 the Association was merged with the American Forestry Congress, but resumed its old name in 1889 and was incorporated in 1897. For the purpose of maintaining public interest in forestry questions, the Association issues a monthly magazine 'American Forestry,' the only national publication of the kind in the United States. The Association has 10,000 members and propaganda is carried on in all the states, and all provinces of Canada, and throughout civilized countries. The Association is generally recognized as the chief exponent of forest conservation. It appoints committees that investigate forest conditions which report at the meetings of National Conservation at Washington.

FORFAR (56° 39′ N., 2° 53′ W.), county town, Forfarshire, Scotland; ancient royal residence; royal burgh; linen and jute manufactures. Pop. 1921, 9,585.

FORFARSHIRE (56° 45′ N., 2° 55′ W.), large maritime and agricultural county in E. Scotland, and corresponding to district of Angus; county town, Forfar. Pop. 1921, 270,950.

FORGERY, making a false document with intent to defraud. This may be done by alteration of its contents, by adding to its contents, or by signing it in the name of any other person with the intention to defraud.

FORGAN, DAVID ROBERTSON (1862), banker. *b.* in Scotland. Had public school education. Was 15 when he entered banking business as messenger of Clydesdale Bank. In 1880 emigrated to Nova Scotia and secured position in Bank of Nova Scotia. From 1883-88 was manager of branch at Fredericton, N.B. 1888-90 at Duluth, Minnesota was assistant cashier of American Exchange Bank. 1890-95 was cashier of Northwestern National Bank of Minneapolis. 1898-1900 president of Union National Bank, President since 1907 National

City Bank of Chicago. Author of *Banking as a Profession.*

FORGING, the working of iron or steel when it is at white heat and thus in a malleable state. It is chiefly a moulding process. The steps are: (1) 'swagging,' or reducing to necessary size, or the converse, 'upsetting,' or enlarging; (2) 'bending' to necessary angle; (3) 'welding,' or joining different pieces; (4) 'holing', or boring; (5) 'severing, or lopping off. Forging is now increasingly done by machinery, and is then known as 'die forging', which reduces the amount of skilled labor required very considerably.

FORLI (44° 13′ N., 12° 2′ E.), town (ancient *Forum Livii*) and episcopal see, Forli, Italy; cathedral; old castle; picture-gallery. Pop. 16,000.

FORLIMPOPOLI (44° 12′ N., 12° 7° E.), town (ancient *Forum Popilii*), Forli, Italy.

FORLORN HOPE (from Dutch, *verloren hoop*, 'a lost troop'), military troop told off for any dangerous employment, such as leading a charge at a critical moment, storming a breach, etc.

FORM, in metaphysics, the developed actuality, that which gives reality to matter (Aristotle); according to Kant, the element of an object due to mind, as distinguished from 'matter', the manifold of sense.

FORMALDEHYDE (H.CHO), one of the organic substances called aldehydes which are formed when the primary alcohols lose two atoms of hydrogen, hence *al*cohol *dehyd*rogenatum. F. is prepared by oxidizing methyl alcohol by passing air saturated with the alcohol vapor over red-hot platinized asbestos. It is a gas at ordinary temperatures, condensing at −21°C. It rapidly decomposes to form metaformaldehyde, a crystalline compound. When the metaformaldehyde is heated, F. is again formed, which decomposes once more on cooling. When the aqueous solution of F. is evaporated, the F. is converted into paraformaldehyde, an amorphous substance. All three substances have the same precentage composition, so that they form an example of polymerization. F. occurs in the chlorophyll cells of plants, and is an effective germicide. *Formalin* is a trade product, consisting of an aqueous solution containing about 40 per cent. of F.; it is much used as an antiseptic.

FORMAN, HENRY JAMES (1879), author and editor. Bachelor of Arts of Harvard in 1903. 1903-05 on staff of New York Sun. During Russo-Japanese Peace Conference served as special correspondent to President Roosevelt. Was member of President's suite on board U.S.S. 'Mayflower,' when he brought together the peace envoys. 1905-06 literary editor of Appleton's Magazines. 1905-06 was political editor of Literary Digest. 1906-10 was associate editor and general manager of North American Review. 1913-14 was on editorial staff of Collier's Weekly. 1918-19 was agent of propaganda in Berne, Switzerland, of German, French and Italian languages for United States Government. Member of Fabian Society, Author's League of America. Author of *In the Footprints of Heine*, 1910; *The Ideal Italian Tour*, 1911; *London—An Intimate Picture*, 1913; *Fire of Youth*, 1920, and in 1922 *The Man Who Lived in a Shoe.*

FORMATION. See GEOLOGY, MINERALOGY.

FORMIA, formerly Mola di Gaeta (41° 15′ N., 13° 38′ E.), town, on Gulf of Gaeta, Caserta, Italy. Pop. 8,000.

FORMIC ACID (H.COOH), fatty acid prepared by heating oxalic acid and glycerine or passing carbon monoxide over soda-lime. Liquid (B.P.101°), pungent irritating odor, blisters skin, has acid reaction and reducing properties.

FORMOSA, or **TAIWAN,** Jap. isl., off coast of China (23° 30′ N., 121° E.), in China Sea. Mountainous—chief summits being Mt. Morrison, 13,000 ft. and Mt. Sylvia, 11,000 ft. Volcanoes in N. Plain stretching to W., with short mt. range presenting sheer cliff to Pacific. Two rivers—both called Tamsui Kai; hot springs numerous; mountains thickly wooded; country fertile, well cultivated, with tropical vegetation. Climate damp and hot; malaria prevalent in N. Typhoons common. Peopled by aboriginals—uncivilized and fierce—Chin. traders, and Japanese. Agricultural products include rice, tea, sugar, camphor, jute, etc. Active fisheries. Industries comprise flour milling, sugar and tobacco, oil, spirits, and ironworks. Minerals: gold, silver, sulphur, petroleum. Livestock: buffaloes, oxen, swine, goats, poultry. Trade mostly with Japan. Cap. Tai-peh-fu. Chief ports are Kelung and Anping. Ruled by Dutch, 1624-61; ceded by China to Japan 1895, under whose rule much progress is being made. Area, *c.* 13,500 sq. miles; pop. 1920, 3,654,398.

FORMOSA, terr., N.E. of Argentine Republic, S. America (26° 12′ S., 58° 14′ W.), occupies forest-covered plain between rivers Paraguay, Pilcomayo, and Bermejo; cattle rearing; sugar, tobacco, rice, cotton; cap. is Formosa, on Paraguay R. Area, 41,402 sq. m.; pop. 1921, 21,880.

FORMULA, prescribed or established rule; a formal confession of faith; a general rule in mathematics; symbolic description of a substance in chemistry, etc.

FORREST, EDWIN (1806-72), Amer. actor; famous in Shakespearean tragedy.

FORREST, NATHAN BEDFORD (1821-77), Amer. soldier; raised regiment for Confederates in Civil War, 1861; became cavalry gen. After many brilliant exploits, surrendered, May 1865. F. was uneducated, but had great natural abilities.

FORST (51° 44′ N., 14° 40′ E.), town, on Neisse, Brandenburg, Prussia; woolen cloth. Pop. 1910, 35,000.

FORSTER, JOHN (1812-76), Eng. historian, biographer, and editor; several hist. works, biographies of Goldsmith and Landor, and standard *Life of Charles Dickens*, 1872-74.

FORSTER, JOHN COOPER (1823-86), Eng. surgeon; surgeon to Guy's Hospital, 1870; pres. of Royal Coll. of Surgeons, 1884; introduced new surgical measures; author of *Surgical Diseases of Children* and other surgical works.

FORSTER, WILLIAM EDWARD (1818-86), Brit. politician; was distinguished member of Mr. Gladstone's Cabinets from 1870 and onwards; Chief Sec. for Ireland, 1880; forced to take strong line of action against Land League, which he proclaimed illegal; opposed separation of Brit. and Irish Parliaments; a Quaker of high character. *Life*, by Reid, 1888.

FORT. See FORTIFICATION.

FORT COLLINS, a city of Colorado, in Lorimer co., of which it is the county seat. It is on the Union Pacific, and the Colorado and Southern railroads, and on the Cache la Poudre River. It is surrounded by a large agricultural region and the manufacture of beet-sugar is an important industry. Flour and bricks are also made. A Lutheran theological seminary and the State Agricultural College are here. There is a park, library, court-house, hospital, and several banks. Pop. 1920, 8,734.

FORT DE FRANCE (*c.* 14° 55′ N., 61° W.), town, Martinique, Fr. W. Indies; has naval arsenal. Pop. 30,000.

FORT DODGE, a city of Iowa, in Webster co., of which it is the county seat. It is on the Minneapolis and St. Louis, the Illinois Central, the Chicago, Great Western and other railroads, and on the Des Moines River. It is the center of an extensive coal mining region and has large deposits of sand, clay and limestone in the neighborhood. It has important manufactures which include the making of clay products, brick and tile, oatmeal, boots and shoes, etc. The city is the seat of Tobin College and St. Joseph's Mercy Hospital. Other public institutions are a court-house and a public library. The repair shops of four railroads which enter the city are here. Pop. 1920, 19,347.

FORT EDWARD, a vil. in the co. of Washington, New York. It stands on the Hudson R., and on the Delaware and Hudson Railroad to the N. of Troy. It has iron and brass works, also paper mills and potteries. It was here that Gen. Burgoyne began his march to Albany. Pop. 4,000.

FORT LEE, a borough of New Jersey, in Bergen co. It is connected by ferry with New York City, of which it is a suburb. During the Revolutionary War one of the forts defending the Hudson was situated here. It is the seat of the Institute of Holy Angels, and of several moving picture studios. Pop. 1920, 5,761.

FORT MADISON, a city of Iowa, in Lee co., of which it is the county seat. It is on the Atchison, Topeka and Santa Fe, and the Chicago, Burlington and Quincy railroads, and on the Missouri River. It has important industries including pork packing, railroad shops, grain elevators, cement works, flour and saw mills, farm implement works, button factories, etc. It is the seat of the State Penitentiary and has a public library, hospitals and parks. Pop. 1920, 12,066.

FORT SCOTT, a city of Kansas in Bourbon co., of which it is the county seat. It is on the St. Louis and San Francisco, the Missouri, Kansas and Texas, and the Missouri Pacific railroads, and on the Marmaton River. In the neighborhood are important deposits of coal, cement, clay, zinc, and lead. The industries of the city include foundry and machine shops, flour mills, cement works, and the manufactures of harness, patent medicine, etc. Pop. 1920, 10,693.

FORT SMITH, a city of Arkansas, in Sebastian co., of which it is one of the county seats. It is on the St. Louis and San Francisco, the Arkansas Central, the Midland Valley, the St. Louis, Iron Mountain and Southern railroads, and is at the junction of the Arkansas and Poteau rivers. The city is the center of a large wholesale jobbing trade for the surrounding country, and it has large industries including saw and planing mills, iron and steel mills, and plants for the making of brooms, stoves, overalls, refrigerators, etc. Within the city limits the river is spanned by four steel bridges. There is a Federal building, post-office, high school, public library, park, hospitals, and a National cemetery. Pop. 1920, 28,811.

FORT STANWIX. See STANWIX, FORT.

FORT SUMTER. See SUMTER, FORT.

FORT WAYNE, a city of Indiana, in Allen co., of which it is the county seat. It is on the Wabash, Lake Shore and Michigan, the Lake Erie and Western, and other railroads, and at the junction of St. Mary and St. Joseph rivers. The city is built on a plateau and covers an area of about 10 square miles. From its elevation it is sometimes known as Summit City. There are important industries including railroad, machine and repair shops, flour mills, knitting mills, oil tank works, and meat packing houses. The public buildings include a United States government building, and county buildings. There are several educational institutions including Concordia College, an institution of the Lutheran denomination. There are two hospitals. French explorers visited this neighborhood about 1700 and founded a trading post named Fort Miami. In 1760 the English constructed a fort here and General Anthony Wayne located a government post here in 1794, from which the city takes its name. Pop. 1920, 86,549.

FORT WILLIAM, a city of Canada, in the province of Ontario, in the Thunder Bay district. It is on the Grand Trunk, Canadian Pacific, and Canadian Northern railroads, and on the Kaministiquia river, at its entrance into Lake Superior. The city has an excellent harbor and has a large commerce from lake traffic. It is the head of navigation on Lake Superior, and is the entrance to the wheat region of western Canada. It has important industries including repair shops of the Canadian Pacific, Grand Trunk Pacific, and Canadian Northern railways, flour mills, stove works, machine shops, car wheel foundries, shipyards, brick yards, breweries, etc. There are also many grain elevators. The public buildings are unusually handsome and include a city hall, court-house, hospitals, library and a collegiate institute. Pop. 1920, about 20,000.

FORT WILLIAM (56° 48′ N., 5° 5′ W.), town, tourist resort, at foot of Ben Nevis, Iverness-shire, Scotland; fortress unsuccessfully besieged by Jacobites, 1746.

FORT WILLIAM HENRY, a fort which is situated on the site of the modern city of Caldwell, N.Y., at the head of Lake George. It was built by Sir William Johnson in 1755. It was attacked in August, 1757, by General Montcalm with a large force of French and Indians, and the commander of the English forces, Colonel Monroe, was olbiged to surrender.

FORT WORTH, a city of Texas in Tarrant co., of which it is the county seat. It is on the Texas and Pacific, the International and Great Northern, Chicago, Rock Island and Gulf, Fort Worth and Denver City, St. Louis and San Francisco, and other railroads, and on Trinity River. It is surrounded by an extensive stock raising and agricultural region and has a large trade in general commodities. It is the distribution point for a large area. Among the products thus distributed are hogs, sheep and cattle, grain, fruit and produce. In the city are large stock-yards with a daily capacity of over 30,000 head of cattle. There are also large packing houses. Its industries include flour and stock-feed mills, rolling mills, railroad repair shops, foundries, cotton and oil mills, clothing factories, chemical works, etc. A large storage dam on the west fork of the Trinity River has been constructed, 7 miles from the city. This has a capacity of over 30 billion gallons of water. Fort Worth has several important educational institutions including Texas Women's College, Texas Christian University, and the Southwestern Baptist Theological Seminary. Other Institutions are a Masonic Orphans' Home and School, several academies, a number of denominational schools, and technical, art and music schools. The city has an excellent technical library and a medical library. There are over 100 churches, 10 hospitals, and over 30 parks. Fort Worth was founded as a military post in 1849. In 1860 it became the county seat, and was incorporated as a city in 1873. Its growth in recent years has been very rapid. Pop. 1920, 106,482.

FORTALEZA (3° 43′ S., 38° 24′ W.), city and port, Ceará, Brazil, near mouth of Ceará; rubber, sugar, cotton. Pop. 33,000.

FORTESCUE, GRANVILLE ROLAND (1875), an American army officer, author and playwright, *b.* at New York, *s.* of Robert Francis and Marion Theresa O'Shea Fortescue. He studied at the University of Pennsylvania but left college at the outbreak and served throughout the Spanish American War, later participated in the Philippine campaign, was military attache with Japanese Army before Port Arthur, witnessing siege, and was at one time military aide to President Roosevelt at the White House. He resigned from the army in 1906 after which he was special correspondent for the London Standard with the Spanish Army in the Riff War, explored the interior of Venezuela, and later was correspondent for the London Daily Telegraph with the French, Eng., Russian, Belgian and Turkish armies in the field. During 1917-18 he served with the A.E.F. in France and was wounded at Mount Faucon. Author: *At the Front with Three Armies*, 1914; *France Bears the Burden*, 1917; and the plays *Delores*, 1915 and *Love and Live*, 1921.

FORTESCUE, SIR JOHN (*c.* 1394-1476), Lord Chief Justice of England under Henry VI.; wrote Latin legal works and *Governance of England.*

FORTESCUE, SIR JOHN (*c.* 1531-1607), Eng. politician; Chancellor of Exchequer and Privy Councillor, 1589; knighted, 1592; Chancellor of Duchy of Lancaster, 1601.

FORTH, riv. and firth, E. of Scotland (56° 7′ N., 4° 14′ W.); river rises on N.E. side of Ben Lomond, flows eastward with many windings (links of Forth), and expands into Firth of Forth; chief tribs., Teith, Allan, and Devon. *Firth of Forth*, an inlet of North Sea, extending from Alloa eastward about 50 m.; navigable for largest vessels to Queensferry, smaller vessels to Alloa; contains islands Inchkeith and Inchcolm (fortified), Cramond; many good harbors; coaling ports; to W. of Forth Bridge on Fife coast is bay of St. Margaret's Hope, with naval base of Rosyth; important fisheries; during World War was base of battle-cruiser fleet. Surrender of Ger. High Seas Fleet took place in Forth, Nov. 21, 1918.

FORTIFICATION, the art of strengthening military positions in such a way that they may be defended by force inferior in number to that which attacks them. Its objects are to give protection to defenders of position and to place obstacles in enemy's way.

Field Fortifications are works constructed for temporary purposes—to shelter troops on the battlefield, or to protect isolated posts. Their construction is as old as the existence of armies. They now generally consist of lines of trenches, the more inconspicuous the better, which protect the occupants, enable them to check the enemy's onslaught by their fire, and to rush upon the attackers at favorable opportunity. Such trenches with parapet and parados completely conceal the occupants, who view the enemy through periscopes and fire through loopholes. To prevent enfilading there are 'traverses' at intervals along the trenches. Dug-outs, sometimes of considerable depth, are provided for protection against shell-fire; the works are approached by communication trenches. During the World War the Germans used fortins or concrete 'pill-boxes' for the shelter of machine gunners; these were so placed as to command the whole area of advance. Another important characteristic of field fortifications is the creation of obstacles to hinder an advance. Among those used, wire entanglements stretched between posts are of the highest importance; during the World War shell-holes were frequently turned into formidable field works by means of barbed wire. The old field redoubts are not now constructed.

A description of former methods of fortification is unnecessary, as early in the World War the old ideas suffered a rude shock. By the use of Skoda howitzers and high explosives the modern forts of Liége and Namur were utterly destroyed, and thenceforth the system was doomed, no combination of concrete and steel being found able to withstand the awful impact of modern high explosives for any length of time. Probably in the future important places will be defended by series of trenches many miles from the town, such trenches being connected by railway capable of moving big guns and their crews to the point desired.

FORTRESS MONROE. See MONROE, FORTRESS.

FORTUNA, FORTUNE (classical myth.), Latin goddess to whom shrines were erected in several places. She was believed to have the power of granting prosperity to whom she would.

FORTUNATUS, character in mediæval stories, who received from Fortune an inexhaustible purse, and stole from the Sultan a cap that would transport its wearer wherever he would go.

FORUM, an open space for the transaction of public business. The Roman f. was a rectangular building, surrounded by basilicas, etc. It was also the name given to a tract of open country in the neighborhood of the Capitoline hills.

FOSCARI, FRANCESCO (1373-1457), Doge of Venice; elected, 1423; supported Florentine campaign against Milan; increased Venetian dominions. His *s.*, Jacopo, accused of receiving bribes and of treason, was imprisoned and exiled.

FOSCOLO, UGO (1778-1827), Ital.

poet and patriot; author of several tragedies of high merit, including *Tieste*, *Ajax*, and *Ricciarda*; and a political work, *Letters of Jacopo Ortis*. At first an admirer of Napoleon, he became disgusted with Bonaparte's despotic aims, and, quitting the Fr. military service, devoted himself to lit.; finally retired to England.

FOSDICK, HARRY EMERSON (1878), an American clergyman, *b.* at Buffalo, N.Y., son of Frank S. and Amie I. Weaver Fosdick. He was educated at Colgate University, Union Theological Seminary and at Columbia. He was ordained a Baptist minister in 1903 and the following year became pastor of the First Church at Montclair, N.J. but resigned this charge in 1915 to become professor of practical theology at the Union Theological Seminary, where he had been an instructor in homiletics since 1908. Author: *The Assurance of Immortality*, 1913; *The Meaning of Prayer*, 1915; *The Meaning of Faith*, 1917 and *The Meaning of Service* in 1920.

FOSDICK, RAYMOND BLAINE (1883), an American lawyer, *b.* at Buffalo, N.Y., son of Frank S. and Amie I. Weaver Fosdick. He was educated at Princeton University and at New York Law School. He began as assistant corpn. counsel, New York in 1908. In 1916 he became a special representative of the secretary of War on the Mexican border, the following year was chairman of the commission on Training Camp Activities of the War and Navy departments, 1918 was special rep. of the War Dept. in France where in 1919 he was civilian aide to General Pershing and from then until 1920 was under secretary general of the League of Nations.

FOSS, or FOSSE (Lat. *fossa*, Fr. *fodio*, I dig), in fortification, a long narrow excavation, such as a moat or ditch, dug outside the walls or rampart of a fort to serve as barrier against the advancing foe and prevent an escalade. It is often filled with water or with abattis, and palisades.

FOSSIL, remains of plants and animals embedded in minerals; term includes foot-marks of animals. Formerly called *petrifactions*, owing to organic parts being replaced by petrifying solution; thus the gradual decay of organic matter allowed each cell to be replaced, and corals, leaves, etc., showing complete structure, are found. Fossil forests have been found in England and elsewhere. The most notable examples are in the southwestern part of the United States. In Arizona is the famous 'petrified forest,' where all the trees have been fossilized into mineral matter. Fossil ferns show the development of the plant from Devonian Period.

FOSTER, JOHN WATSON (1836-1917), diplomat; *b.* Pike co., Indiana; *d.* Washington, D.C. He graduated from Indiana State University and was admitted to the Indiana bar after studying law at Harvard. In the Civil War, where he served in the Union army as a major, he distinguished himself at Fort Donelson and Shiloh and was promoted to colonel. Afterwards he was editor of the Evansville Daily Journal and postmaster of that town. His diplomatic career began in 1873, when he was appointed Minister to Mexico. In 1880 he became minister to Russia and in 1883 minister to Spain. Between 1892 and 1893 he served as Secretary of State in the Harrison administration. He represented the United States in the Bering Sea Arbitration at Paris in 1893 and at the Alaska Boundary Tribunal which met in London in 1903. China sought his aid as her representative at the peace negotiations ending the war with Japan in 1895, and he also represented that country at the Second Hague Conference in 1907. He negotiated a number of treaties for the United States and was the nation's special ambassador on several missions to foreign countries. China conferred upon him the Order of the Golden Grain in 1916. His writings, which relate largely to arbitration and diplomacy, include *Diplomatic Memoirs*, published in 1909.

FOSTER, MAXIMILIAN (1872), an American author, *b.* at San Francisco, son of William Hammond and Leila Love Foster. He was educated at Drisler School, New York and at Andover, Mass. Academy. He was engaged in writing for various New York newspapers and magazines for 10 years but in 1901 took charge of the private car line railroad equipment of the Ellsworth Coal Co. and remained in their employ until 1906. He was the author of: *In the Forest*, 1902; *Keeping Up Appearances*, 1911; *Shoestrings*, 1916 and *The Tramp*, 1920. Also the plays *Rich Man Poor Man*, 1916 and *Smoke*, 1919 and in 1918 was official correspondent for the U.S. Govt. in France with the A.E.F.

FOSTER, SIR MICHAEL (1836-1907), Eng. physiologist; prof. of Physiology at Univ. Coll., London; author of *Textbook of Physiology* and other works.

FOSTER, STEPHEN COLLINS (1826-64), composer and song-writer; *b.* Pittsburgh; *d.* New York. At an early age he became acquainted with vocal and instrumental music and began producing songs before he was twenty. Many of his numbers were derived from negro sentiment, and he did more to popularize the musical expression of pathetic themes that reflected the emotional side of the colored race. He wrote both the words and music of about 125 songs, among them *The Old Folks at Home*; *Old Black Joe*; *Massa's in the Cold, Cold Ground*; *Old Dog Tray*; *Come Where My Love Lies Dreaming*; and *Suwanee River*.

FOSTER, WILLIAM TRUFANT (1879), an American college president, *b.* at Boston, *s.* of William Henry and Sarah Jennie Trufant Foster. He was educated at Harvard and Columbia Univs. After being instructor in English at Bates College and later professor in English and argumentation at Bowdoin he became president of Reed College, Portland, Ore. in 1910 in which position he remained until 1920 when he became director of the Francis D. Pollak Foundation for Economic Research. Author: *Argumentation and Debating*, 1908; *Administration of the College Curriculum*, 1910; *Essentials of Exposition and Argument*, 1911; *Social Hygiene and Morals*, 1913 and *Should Students Study*, 1917.

FOSTER, WILLIAM WILSON, JR. (1849), an American college president *b.* at Moriah, N.Y., son of William W. and Frances Wheelock Foster. He was educated at Ft. Edward, N.Y. Collegiate Institute, Drew Theological Seminary and at the Boston Univ. School of Theology. He was ordained an M.E. minister in 1873 and was afterwards pastor of several churches including the Embury M.E. Church, Cambridge, N.Y. from 1918-21. He was pres. of Rust University, Holly Springs, Miss. from 1898 to 1909, of Beaver, Pa., College, 1909-10 and of Clarke University, Atlanta, Ga. from 1912-18, of which institutions he was trustee after he retired in 1921. Author: *Studies in Genesis* and *Samuel the Prophet*.

FOSTORIA, a city of Ohio, in Seneca and Hancock counties. It is on the Baltimore and Ohio, the Hocking Valley, the New York, Chicago and St. Louis, and other railroads. It is an important industrial city and has limekilns, manufactures of glass, automobiles, lumber, etc. In the surrounding area are extensive coal fields. The city takes its name from its founder, the father of Charles Foster, Governor of Ohio and secretary of the U.S. Treasury, 1891-3. Pop. 1920, 9,987.

FOTHERING (H)AY (52° 32′ N., 0° 27° W.), village, Northamptonshire, England. Ancient ruined castle was scene of imprisonment and execution of Mary, Queen of Scots, 1587.

FOUCAULT, JEAN BERNARD LÉON (1819-68), Fr. scientist; Copley medallist, Royal Soc., 1855; invented gyroscope and polarizer, determined the absolute velocity of light, and demonstrated diurnal motion of the earth.

FOUCHÉ, JOSEPH, DUKE OF OTRANTO (1763-1820), Fr. politician; entered enthusiastically into Revolution; prominent in Jacobin movement; suppressed revolt at Lyons with utmost severity; on return quarrelled with Robespierre, who had him expelled from Jacobin Club; imprisoned for short time in 1795; ambassador to Cisalpine Republic, 1797; Chief of Police, 1799, continuing in office under Napoleon, who cr. him Duke of Otranto, 1808; deprived of office, 1810, and sent to Rome as titular gov. After Napoleon's fall, F. became Minister of Police under Louis XVIII.; retired from public life, 1816, and *d.* in exile.

FOUGÈRES (48° 20′ N., 1° 12′ W.), town, Ille-et-Vilaine, France; formerly one of strongest places in Brittany, frequently besieged; boots and shoes manufactured. Pop. 21,000.

FOULKE, W(ILLIAM) HARGRAVE (1851), a bishop, *b.* at Shepherdstown, W. Va., *s.* of William Henry and Mahala Ann Chaplain Foulke. He was educated in the common schools at Dixon, Ill. and took a conference course of four years after entering the ministry. He was licensed to preach in 1876 and was pastor of various churches in Illinois until 1895. He was presiding elder of the Freeport Dist. from 1896-9; pastor at Naperville, 1900-2; editor of S.S. and C.E. literature, 1902-10 and was a bishop from 1910-18 when he became asso. editor of Evangelical.

FOULKE, WILLIAM DUDLEY (1848), author and lawyer; *b.* New York City. After graduating in 1869 at Columbia Law School he practiced in New York and removed in 1876 to Indiana, where he acted as attorney for the Pittsburgh, Cincinnati and St. Louis Railroad for fifteen years, served in the State Senate, 1882-6, and edited the *Palladium* and the *Evening Item*. He became interested in civil service reform, undertaking several investigations in that field for the government, and from 1901 to 1903 was U.S. Civil Service Commissioner. He also headed the National Municipal League from 1910 to 1913. His writings include novels, plays, and contributions to periodical literature on historical, administrative and other themes. In 1922 he published *A Hoosier's Autobiography.*

FOULOIS, BENJAMIN DELAHAUF (1879), army aviation officer; *b.* Connecticut. He graduated from the Infantry and Cavalry School in 1906 and two years later from the Army Signal School after serving in the ranks (engineers and infantry) as private, corporal and sergeant. He was promoted to first lieutenant of infantry, and with that rank was assigned to the Signal Corps in 1908, becoming aviation captain, then major, and provisional brigadier-general of the air service in 1917. He saw service as aviation officer in Mexico, 1916-17, and took a leading part in organizing American aerial plans in the World War, including the drafting of the aviation bill of 1917 outlining an expenditure of $640,000,000. He was chief of the air service of the American Expeditionary Force in that conflict and a member of the Aviation Committee of the Supreme War Council.

FOUNDATIONS are the natural earth-bed, rock, or other substance upon which the walls of a building rest. In selecting the site for a structure it is first of all necessary to examine the nature of the ground, and if a substantial natural f. cannot be reached at a moderate depth it must be provided by artificial means (*e.g.* by piles or concrete). Rock is the best natural f.; certain kinds of clay also serve the purpose; and sand and gravel likewise possess good weight-bearing qualities, but these latter are subject to the action of 'scour,' (*i.e.*) disintegration by water. Then, sometimes, the ground itself is of an artificial character, which means that at some period a hollow has been filled in with waste material, and where this is encountered it is always necessary to go deeper until a substantial natural f. is reached. A bed of concrete is now the method usually employed to provide a f. where the ground is found insufficient to support a building; and the alternative to this is the use of piles, which are driven deep into the soil, and upon the heads of which a timber platform is laid; piles are used in canal-cities like Venice and Amsterdam. Stone footings to the walls are also sometimes used.

FOUNDER, popular name for Laminitis, disease of horses and cattle in which laminæ of foot are inflamed; treatment consists in bleeding, poulticing, and purges, because f. is frequently caused by indigestion or constipation.

FOUNDING, or **MOULDING,** is a method of casting metals by preparing a mould in green or dry sand or in loam. A pattern, usually of wood, but sometimes of metal, is used; the sand is firmly beaten about it and damped; the pattern is withdrawn, and molten metal poured in. In order to withdraw the pattern it is necessary that the mould should be made in two parts, which fit upon one another.

FOUNDLING HOSPITALS are institutions established for the care and education of abandoned children, and, either State-supported or otherwise endowed, are to be found in France, Italy, Russia, America, and other civilized countries.

FOUNTAIN may be either a natural flow of water from a rock, or from the soil, or a stream diverted into an artificial and ornamental basin. The early Greeks were especially fond of constructing ornamental f's, and they were usually dedicated to deities or heroes. The Romans also built some celebrated f's. Excellent modern examples are to be found in Paris and at Versailles.

FOUQUÉ, FRIEDRICH HEINRICH KARL DE LA MOTTE (1777-1843), Ger. soldier and romanticist; wrote *Undine* and many novels, plays, and romances.

FOUQUET, NICHOLAS, FOUCQUET (1615-80), Fr. statesman; Viscount of Melun and Vaux, Marquis of Belle-Isle; through influence of Mazarin became Procureur-Général, 1650; Finance Minister, 1653.

FOUQUIER-TINVILLE- ANTOINE QUENTIN (1746-95), Fr. revolutionist; public prosecutor under the Terror; guillotined.

FOUR-POWER TREATY. See CONFERENCE ON THE LIMITATION OF ARMAMENTS.

FOURIER, FRANÇOIS CHARLES MARIE (1772-1837), Fr. social philosopher, developed theory of social reorganization based on principle of co-operation. F. wrote *Theorie des Quatre Mouvements et des Destinees Generales, etc.*

FOURIER, JEAN BAPTISTE JOSEPH (1768-1830), Fr. mathematician; served in Egypt under Bonaparte; chief works: *Analyse des Equations determinees* and *Theorie Analytique de la Chaleur*, in the latter of which he suggested what are now known as Fourier's Series.

FOWL, a domestic bird of Asiatic and Amer. origin; body stout and flight feeble; cock polygamous and often brightly colored; hen usually shows more subdued plumage; both characterized by possession of wattles and comb, these being larger in male than female;

young, produced from eggs, covered with down at birth.

FOWLER, ELLEN THORNEYCROFT (1860), British novelist; *b.* Wolverhampton, England; daughter of Viscount Wolverhampton. She was married to Alfred Lawrence Felkin in 1903. She became of note as a writer with the publication in 1898 of *Concerning Isabel Carnaby*, a popular novel which was followed by *A Double Thread*, *The Farringdons*, *Fuel of Fire*, *Place and Power*, *The Subjection of Isabel Carnaby*, *Ten Degrees Backward*, and 1920, *Beauty and Bands*. She also wrote a number of short stories and poems.

FOWLER, HAROLD NORTH (1859), an American university president, *b.* at Westfield, Mass., son of Samuel and Maria Jones Fowler. He was educated at Harvard and later studied in Athens and at the universities of Bonn and Berlin. After being an instructor and professor at various American universities he became permanently connected with the College for Women, Western Reserve University, in 1893, as professor of Greek, however he was also professor of Greek language and literature at the American School of Classical Studies, Athens during 1903-4 and was editor-in-chief of the American Journal of Archaeology from 1906-16. Translator: Plato, Vol. 1, in the Loeb Classical Library, 1915, Vol. 2, 1921.

FOX (*Canis vulpes*), an animal allied to the wolf, dog, and jackal, and included with them in group *Canidoe*; characterized by long, bushy tail, or *brush*, by upright and somewhat large ears, short legs, and comparatively slender build; extremely intelligent and cunning, and feeds upon various small mammals and birds, and also fruit; preserved for hunting in Britain; his astuteness has made him a favorite character in fable, the classic being Reynard the Fox.

FOX, CHARLES JAMES (1749-1806) Brit. (Whig) statesman; 3rd *s.* of Henry Fox, Lord Holland; *b.* Westminster; ed. Eton and Oxford; early addicted to gambling; M.P., 1768; junior lord of Treasury, 1773; quarrelled with Lord North and joined Opposition, 1774; influenced by Burke; became great leader of Whigs; opposed Lord North's Amer. policy and sided with colonists; Foreign Sec. under Rockingham, 1782, but retired soon after latter's death, and later formed ministry with Lord North known as the *Coalition*, which was unpopular both with king and country, and ended, 1783. After Pitt's death in 1806 F. became Foreign Sec., but died a few months afterwards and was buried in Westminster Abbey. A brilliant orator and possessed of great personal charm, his powerlessness as a statesman is attributable partly to the reputation gained by his early excesses, partly to the continued disfavor of George III.

FOX, EDWARD (*c.* 1496-1538), Eng. bp.; sent on missions concerning Henry VIII.'s divorce; had share in drawing up Ten Articles, 1536.

FOX, FONTAINE TALBOT, JR. (1884), an American newspaper cartoonist, *b.* at Louisville, Ky., son of Fontaine Talbot and Mary Pitkin Barton Fox. He was a student at Indiana University for two years but left college in 1906 to accept a position with the Louisville Herald as cartoonist and was later employed as a cartoonist by the Louisville Times and the Chicago Evening Post, after which he became permanently connected with the Wheeler Syndicate, New York in 1915, which furnished humorous cartoons to about 100 newspapers. Some of his originations were *Fontain Fox's Funny Folk*, 1917; *Fontain Fox's Cartoons*, 1918 and *Toonerville Trolley* and others in 1921.

FOX, GEORGE (1624-91), Eng. Quaker; founder of Society of Friends; *b.* Drayton; early gave himself up to religion; began to preach in 1647, and soon afterwards began missionary travels which continued throughout his life; many times imprisoned; travelled in Scotland, Ireland, W. Indies, America, Holland; advocated doctrine of 'Light within,' and discontinuance of sacraments and tithes; *d.* in London.

FOX, JOHN (WILLIAM) (1862-1919), novelist; *b.* Bourbon County, Kentucky. He graduated from Harvard in 1883 and entered journalism and business, later settling in Virginia at Big Stone Gap, where he wrote novels of mountain life. Among his notable works are *The Little Shepherd of Kingdom Come* and *The Trail of the Lonesome Pine*. He was a press correspondent in the Russo-Japanese War of 1904 and recounted his experiences in *Following the Sun Flag*.

FOX, RICHARD (*c.* 1448-1528), Eng. bp.; chief sec. to Henry VII.; bp. of Exeter and Lord Privy Seal, 1487; bp. of Bath and Wells, 1492; of Durham, 1494; arranged commercial treaty with Netherlands, and marriage of James IV. of Scotland and Margaret, *dau.* of Henry VII.; Chancellor of Cambridge, 1500; bp. of Winchester, 1501; founded Corpus Christi Coll., Oxford, 1515-16.

FOXE, JOHN (1516-87), an English martyrologist, *b.* in Boston, Lincolnshire. He entered the university of Oxford, taking both the bachelor's and master's degrees in 1537 and 1543 respectively, being elected a full fellow of Magdalen College in 1539. He applied himself assiduously to the study of theology, and became a convert to the principles of the Reformation in 1545, resigning his fellowship in consequence. He then went abroad and gained a livelihood by correcting the press for an eminent printer at Basle. In the reign of Elizabeth he returned to England and came under the notice of the Duchess of Richmond, through whose influence he eventually obtained employment as tutor to the children of her brother, the Earl of Surrey. In 1550 F. was ordained deacon by Ridley, Bishop of London, and began preaching the doctrines of the Reformation. He was ordained priest in 1560, and three years later was made a prebendary in Salisbury Cathedral by the influence of Cecil. He held successively the livings of Shipton and Cripplegate, but soon resigned these, and for a year held a stall at Durham. The work that has immortalized F.'s name is his *History of the Acts and Monuments of the Church*, known as *Foxe's Book of Martyrs*. The first English edition appeared in 1563, and it has since gone through innumerable editions, the best ones being by Cattley, Mendham and Pratt, and Stoughton. Besides this F. wrote numerous controversial and other works. F. died in London, and was buried in the chancel of St. Giles', Cripplegate.

FOXES, or **FOX INDIANS**, an Algonquin tribe of N. American Indians, called by themselves 'Muskwakiuk.' Their original home was in central Wisconsin and round the headwaters of the Mississippi. Towards the end of the 18th century, they allied themselves with the kindred Sauks, and most of the two tribes now occupy a reservation in the Indian territory beyond the Canadian and Arkansas rivers, though some have purchased land in Iowa. They number under 1000.

FOXGLOVE, natural order *Scrophulariaceae*, biennial and perennial plants; common purple foxglove (*Digitalis purpurea*) contains a poison, digitalis, used medicinally.

FOXHOUNDS, dogs capable of great speed and endurance, used in fox-hunting; chief characteristics of good f. are: short back, large head with long ears, straight fore-legs, round feet with well arched toes; color is generally white, with black and tan markings; height, 20-24 inches.

FOX-HUNTING.—The fox has been hunted especially in England since Anglo-Saxon times, but till the middle of the XVII. cent. more for the purpose of extermination than for sport. The modern form of f.-h. may be said to date from the reign of Charles II., when it became exceedingly popular with wealthy landowners, and packs of hounds were kept in all parts of England.

Fox hunting is carried on in many parts of the United States, where clubs for the pursuit of the sport have been organized.

FOX RIVER, the name of two rivers of Wisconsin. (1) The Fox or Pishtaka R. has a course of 220 m., flowing first S., then S.W., entering the Illinois at Ottawa. (2) The Fox or Neenah R. has a generally N.E. course, for 250 m. In the wet season, the floods spread, and a natural connection is established between Lake Michigan and the Mississippi. By means of a canal, however, ships can pass all the year round.

FOX-SHARK (*Alopecias vulpes*), found in Atlantic and Pacific Oceans; upper lobe of tail is tremendously lengthened; total length, 5-12 feet; feeds on small fish, but does not attack man.

FOX TERRIER. See Dog Family.

FOY, MAXIMILIEN SÉBASTIEN (1775-1825), Fr. soldier and politician; served with distinction in Fr. Revolutionary wars; fought in Netherlands, Italy, Austria, Turkey, Peninsula; wounded at *Waterloo*.

FRA DIAVOLO, soubriquet of Michele Pezza (*c.* 1760-1806), Ital. brigand and soldier; considerable source of annoyance to French troops in Italy, 1799-1806; captured and executed; F. D. is name of opera by Auber.

FRACASTORO, GIROLAMO (1483-1553), Ital. physician; prof. of Philosophy at Padua, 1502, afterward practicing med. at Verona; author of a once famous rhyming medical work, *Syphilidis, sive Morbi Gallici*, and of many other works and poems.

FRACKVILLE, a borough of Pennsylvania, in Schuylkill co. It is on the Pennsylvania and the Philadelphia and Reading railroads. It is the center of an important coal mining area and the mining of coal is its chief industry. Pop. 1920, 5,590.

FRACTIONS. See Arithmetic.

FRACTURE. See Geology.

FRACTURE. See Bones, Surgery.

FRAGA (41° 30′ N., 0° 15′ E.), town, Huesca, Spain; formerly in hands of Moors, well fortified till Peninsular War. Pop. 7,000.

FRAGONARD, JEAN HONORÉ (1732-1806), a French painter, *b.* at Grasse, Provence; studied under Chardin and Boucher in 1752, won the Prix de Rome. He then went to Italy, and was much influenced by the work of the Venetian painter Tiepolo. He illustrated St. Non's *Voyage de Naples et de Sicile.* In 1765 he returned to France, and executed 'Callirrhoë', commissioned by Louis XV. for reproduction in tapestry. Several of his most famous tapestries are owned by collectors in the United States. He produced several decorative paintings and many landscapes, and also worked in pastel and water-color and engraved, but his best known works are genre paintings of contemporary life, notable for their humanity, free-drawing, and charming color. Many are in the Louvre, including 'Bacchante Asleep', 'Nymphs at the Bath', 'Music Lesson', 'The Guitar Player', 'Cupid and a Girl', 'The Happy Mother' and 'The Cradle'.

FRAMING, the craft of embellishing pictures and mirrors with carved or gilded frames, began in England in Tudor times. Composition moulding, in place of carved wood, is now largely used.

FRAMINGHAM, a town of Massachusetts, in Middlesex co. It is on the New York, New Haven and Hartford railroad, and on the Sudbury River, 20 miles W. of Boston. Included within its limits are the villages of Framingham, South Framingham and Saxonville. The town has a high school, historical and natural history societies, and is the seat of a State Normal School and the State Women's Reformatory. It is connected by electric railroad with neighboring towns and cities. Pop. 1920, 17,033.

FRANC, Fr. silver coin dating from 1795; a piece of similar value and same name exists in Belgium and Switzerland. Divided into 10 décimes, each of these being subdivided into 10 centimes. Prior to 1914 it was worth about 20 cents in American currency, but after World War sank for a time as low as seven cents.

FRANCAVILLA (40° 33′ N., 17° 35′ E.), town, Apulia, Italy; textiles. Pop. 22,000.

FRANCE, a republic of Western Europe (42° 20′-51° N., 7° E.-5° W.); includes isl. of Corsica (42° N., 9° E.); in N.E. France approaches within 21 m. of Eng. coast. Boundaries of France, taken clockwise from Straits of Dover, are Belgium, Luxemburg, Germany (the Palatinate and riv. Rhine), Switzerland, Italy, Mediterranean Sea, Spain, Atlantic Ocean, and Eng. Channel. Coast of Brittany is rocky and indented; farther E. are high chalk cliffs, farther S. flat and sandy; Mediterranean shore bordered by dunes and marshes W. of Rhone, but to E. of that river the Alps are close to the sea. The highlands of France lie mainly to the S. round the central plateau, which contains the Auvergne (6,188 ft.), Cévennes (5,584 ft.), Morvan, and La Marche. E. of this plateau are the Alps (Mont Blanc, 15,780 ft.) and Jura Mts.; W. are the Pyrenees (Maladetta, 11,168 ft.). Between central plateau and Alpine and Pyrenean folded ranges (both barriers to communication) are easy routes of Rhone and Garonne valleys, connecting Mediterranean with northern plain. In E. are Vosges (4,680 ft.) and western extremity of Ardennes; in N.W. are heights of Britteny. The principal rivers are the Seine (485 m.), flowing through the Parisian basin, where the main tributaries—Yonne, Marne, Aisne, Oise—converge; the Loire (634 m.), from the central plateau to the Bay of Biscay, with network of tributaries linked to other rivers by canals; the Garonne (404 m.), flowing with Dordogne into the Gironde, and joined from Toulouse to Mediterranean by Canal du Midi; the Rhone (504 m.), from the Alps, joined by the slow-flowing Saône; and the Rhine forms part of the eastern frontier. The climate of the N. is like that of southern England, but becomes continental in the center and E.; mild, wet winters mark the Mediterranean shorelands, where the summers are relatively dry and hot. Rich soils and plentiful rains make France an agricultural country; over 60 per cent. of the surface was cultivated or under grass in 1913; wheat, rye, barley, oats, and potatoes are grown in N. and center, sugar beet in N.E., flax and hemp in N.; vines grow best in Burgundy, Champagne, and round Bordeaux; silk is produced in the Rhone valley. Of the 8,000,000 people engaged in agriculture in 1914, 3,000,000 were mobilized, and the majority of the 1,400,000 men lost in the World War belonged to this class; ten of the richest departments — Pas - de - Calais, Nord, Somme, Ardennes, Aisne, Oise, Marne, Meuse, Meurthe-et-Moselle, Vosges—have been laid waste; in 1918 the acreage under crops and the harvests alike were greatly reduced; the war has had a similar effect on the numbers of livestock. There are fisheries on coasts of Flanders, Brittany, and Provence. The invaded region included the principal coal and iron areas, and the seats of many great industries. France was deprived of 68 per cent. of her coal, 47 per cent. of her coke, 90 per cent. of her iron, 85 per cent. of her cast iron, 60 per cent. of her steel, 75 per cent. of her sugar, 85 per cent. of her woolen factories, 65 per cent. of her cotton mills, and 85 per cent. of her flax. The future status will be modified by the recovery of Alsace-Lorraine, where textile and mining industries were flourishing. It will take ten years to get all the coal mines into full swing. The production of coal in tons was 39,816,000 in 1913, 20,000,000 in 1919; 28,240,887 in 1921. In addition to iron, copper, aluminium, lead, silver, zinc, and salt are largely mined. Alsace-Lorraine is rich in potassium. Olive oil is prepared chiefly round Marseilles. Silk is the only industry that escaped damage during the war; it is manufactured in Isère, Rhone, Loire, Ardèche, and Saône-et-Loire. The effect of the war on commerce has been to increase imports (in 1919 three times over those of 1913), while exports remain practically the same; thus France is faced with a steadily increasing commercial deficit. Communications by road are excellent; five great railway companies — Nord, Est, Paris, Lyon-Méditerranée, Orléans, and Midi—and the État or State line give services to all parts; in 1913 the mileage was 31,870. In 1921 the mileage was 26,250. The decrease represents the effects of the war on railroad operations. Waterways have been somewhat neglected; main canals are in N. and E. giving access to Belgium and the Rhine; in 1913 there were 5,480 m. of navigable rivers, and 3,104 m. of canals. The mercantile marine totals about 2,500,000 tons.

The population was 39,601,509 in 1911; of these 1,159,835 were foreigners, chiefly Italians, Belgians, Spaniards, and Germans. In 1921 the population was 37,499,394. The birth-rate is low; the war losses were 1,400,000. Area, including Alsace-Lorraine, 212,822 sq. miles.

Government and Constitution.—The executive power is in the hands of a president elected for seven years; he is assisted by ministers. Legislative power is exercised by Chamber of Deputies, elected for four years, and Senate, elected for nine years, one-third retiring every three years; manhood suffrage obtains. Side by side with these is an advisory council of state. For administrative purposes France is divided into 86 departments. Alsace-Lorraine forms three additional departments; these are divided into 362 arrondissements, subdivided into 2,915 cantons and 36,241 communes. For judiciary purposes the Cour de Cassation is supreme; under it are 26 courts of appeal.

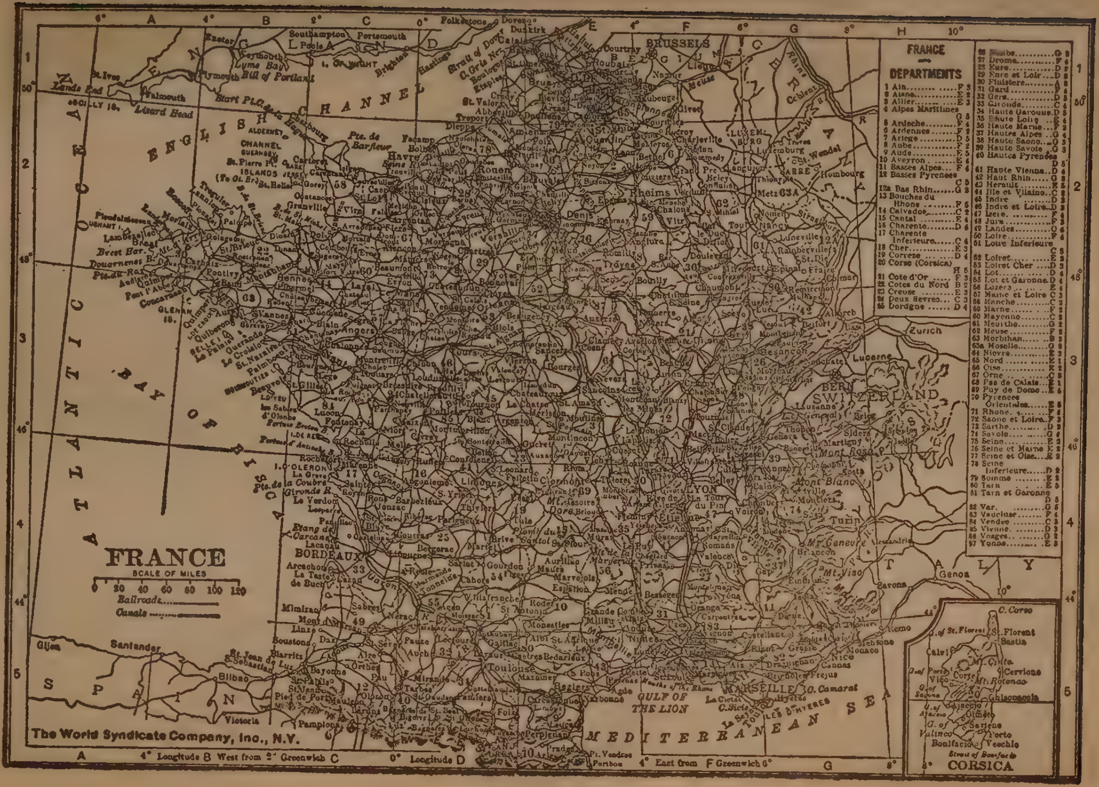
Education.—Public instruction falls into primary or elementary, secondary (*lycees et colleges*), and higher universities. The Fr. educational system is now in force in Alsace-Lorraine. The minister of public instruction is at the head of univ. and school education. For educational administration purposes France is divided into *academies*, one in Algeria, each under a rector, assisted by several inspectors. The Sorbonne in Paris is the seat of the faculties of literature and science of the univ. of Paris. It was founded under St. Louis by Robert de Sorbon, 1211-74, and first intended for theol. The Collège de France, close to the Sorbonne, is independent of the univ.; it was founded by Francis I., and is a public institution. Primary education is compulsory between ages of 6 and 13—free, secular.

Religion.—Till 1905, when the Church was disestablished, Roman Catholicism was the officially recognized religion. Church property passed to the state in 1907, since when there has been no state religion. Freedom of worship is allowed to all creeds. There are 17 archbishoprics.

Army and Navy.—France is at present divided into 21 regions, in each of which an army corps is stationed in time of peace. By law of 1913 service is compulsory for all males between ages of 20 and 48 years. The effective force on all fronts, Sept. 1, 1918 was 2,888,730; the number mobilized was 7,917,000 men, or 20.4 of the total pop. In 1923 there were about 500,000 men under arms; the Fr. recruiting system is now in force in Alsace-Lorraine. In 1918 the Fr. navy comprised 1,296 vessels, excluding transports; their work was principally in the Mediterranean. The coasts are divided into five mar. prefectures, with headquarters in fortified ports of Cherbourg, Brest, L'orient, Rochefort, and Toulon. There is also a prefecture at Bizerte, Tunis.

Colonies and Dependencies include:—In Africa: Algeria, Tunis, Sahara, Fr. W. Africa, Fr. Equatorial Africa, Mayotte and Comoro Islands, Madagascar, Réunion, Fr. Somaliland, and a virtual protectorate over Morocco. African possessions are increased as a result of the World War. In Asia: Fr. India, Fr. Indo-China. In Oceania: New Caledonia, with dependencies, Loyalty Islands, etc., New Hebrides, under joint Franco-Brit. administration, Society Islands, Tahiti, and other Pacific islands. In America: S.—Fr. Guiana; N.—Guadeloupe, Martinique, St. Pierre, and Miquelon. Total area is *c.* 4,500,000 sq. m.; pop. *c.* 41,000,000. See separate articles.

French History.—For the history up to the invasion of the Franks, see GAUL. For the FRANKS, see art. under that



FRANCE

DEPARTMENTS

1 Ain	F	3
2 Aisne	E	2
3 Allier	E	3
4 Alpes Maritimes	G	5
5 Ardeche	F	4
6 Ardennes	F	2
7 Ariege	D	5
8 Aube	F	2
9 Aude	E	5
10 Aveyron	E	4
11 Basses Alpes	F	4
12 Basses Pyrenees	C	5
12a Bas Rhin	G	2
13 Bouches du Rhone	F	5
14 Calvados	C	2
15 Cantal	E	4
16 Charente	D	4
17 Charente Inferieure	C	4
18 Cher	E	3
19 Correze	D	4
20 Corse (Corsica)	H	5
21 Cote d'Or	F	3
22 Cotes du Nord	B	2
23 Creuse	E	3
24 Deux Sevres	C	3
25 Dordgne	D	4
26 Doubs	G	3
27 Drome	F	4
28 Eure	D	2
29 Eure et Loir	D	2
30 Finistere	A	2
31 Gard	F	4
32 Gers	D	5
33 Gironde	C	4
34 Haute Garonne	D	5
35 Haute Loire	E	4
36 Haute Marne	F	2
37 Hautes Alpes	G	4
38 Haute Saone	G	3
39 Haute Savoie	G	3
40 Hautes Pyrenees	D	5
41 Haute Vienna	D	4
42 Haut Rhin	G	3
43 Herault	E	5
44 Ille et Vilaine	C	2
45 Indre	D	3
46 Indre et Loire	D	3
47 Isere	F	4
48 Jura	F	3
49 Landes	C	5
50 Loire	F	4
51 Loire Inferieure	C	3
52 Loiret	E	3
53 Loiret Cher	D	3
54 Lot	D	4
55 Lot et Garonne	D	4
56 Lozera	E	4
57 Maine et Loire	C	3
58 Manche	C	2
59 Marne	F	2
60 Mayenne	C	2
61 Meurthe	G	2
62 Meuse	F	2
63 Morbihan	B	3
63a Moselle	G	2
64 Niovre	E	3
65 Nord	E	1
66 Oise	E	2
67 Orne	C	2
68 Pas de Calais	E	1
69 Puy de Dome	E	4
70 Pyrenees Orientales	E	5
71 Rhone	F	4
72 Saone et Loire	F	3
73 Sarthe	D	3
74 Savoie	G	4
75 Seine	E	2
76 Seine et Marne	E	2
77 Seine et Oise	E	2
78 Seine Inferieure	D	2
79 Somme	E	2
80 Tarn	E	5
81 Tarn et Garonne	D	5
82 Var	G	5
83 Vaucluse	F	4
84 Vendee	C	3
85 Vienne	D	3
86 Vosges	G	2
87 Yonne	E	3

head. The Frank Chlodwig (Clovis, Louis) took possession of the whole of Gaul after defeating the Romans, 486, the Germans, the Ripuarian Franks, and the Alemanni. He became a Christian, 496. He divided his kingdom between his four sons—a custom carried on in the next dynasty. The Frankish kings finally became *rois faineants*, and were entirely ruled by the *Maires du palais*, one of whom, Charles Martel, repulsed the Saracens at Poitiers, 732, thus saving Europe. His son, Pépin le Bref, took the crown, 752, and was ancestor of the Carolingians, 752-987. His son was Charlemagne, 768-814, who became sole master of France. Charlemagne's son, Louis le Débonnaire, 814-40, was not the man to carry on his work. His sons revolted against him, and after his death, by the Treaty of Verdun, 843, divided the empire into Germany, France and Lorraine, with Charles le Chauve, 843-77, as King of France. In 877, by the Edict of Kiersy-sur-Oise, Charles allowed his vassals' land and offices to become hereditary, thus establishing Feudalism.

The later Carolingian kings were too weak to repel the Northmen, who had already appeared at the end of Charlemagne's reign and had sailed up the rivers, plundering and burning. The lords called to the throne Charles le Gros, 884, King of Germany, thinking he would have more power than the lawful heir; but under his reign the Northmen came as far as Paris. Charles bribed the Northmen to retreat, and was dethroned for his cowardice. Charles le Simple, 896-923, the restored Carolingian king, gave by the Treaty of St. Claire-sur-Epte, 912, the province since called Normandy to the Northmen.

Capetians.—The barons, who had brought the Carolingians to the throne, had taken their provinces one by one, administered them, and usurped most of the royal functions. Hugh Capet began the third dynasty, that of the Capetians, 987-1792.

Louis VI. 1108-37, one of the strongest kings of the line, helped the Communes to win their franchise, established order in his demesne, and encouraged local forces to fight in his army. The reign of Louis VII. 1137-80 was unfortunate. He went on the Second Crusade, 1147, with Conrad, Emperor of Germany, against the advice of his minister, Suger, after whose death he repudiated his wife, Eleanor of Aquitaine. Eleanor married 1152, Henry II., future King of England, who thus became possessor of her dominions.

By Philip Augustus 1180-1223, the throne of France was much strengthened. He went on the Third Crusade with Frederick Barbarossa and Richard Cœu de Lion, whom he encouraged in revolt against his father, Henry II. They took St. Jean-d'Acre together, but disagree afterwards, and Philip went back t France, and plotted with King John o England to take Normandy. After th death of Richard I., Philip Augustu confiscated Normandy, Anjou, an Poitou, 1204, and won the battle o Bouvines, 1214. In the S. the religiou war of the Albigenses ended in Simo de Montfort's taking Toulouse from it count, Amaury. After the death o Louis VIII. 1223-6 his widow, Blanch of Castille, was regent until 1236, and with the aid of the poet Count Thibau of Champagne, repressed the nobles she prepared the union of several provinces to the crown, and carefully educated her son Louis IX. 1226-70, one c the finest figures of Fr. history. He le the two last Crusades, 1248, 1270 an died of the plague at Tunis.

Philip III. *le Hardi*, 1270-85, adde Poitou and Toulouse to the crown; hi son, Philip IV. *le Bel*, 1285-1314, adde Navarre and Champagne. After war with England he married hi daughter Isabelle to the son of Edward of England, a marriage which led late to the Hundred Years' War. Increase expenses of administration led him t raise new taxes on salt (the *gabelle*) Jews, Lombards, the clergy, etc., and h forbade the Pope's taxes to be paid. Th three sons of Philip *le Bel*, Louis X Philip V., and Charles IV., reigned i turn. They had no son, and as it wa decreed by the old Frankish *loi saliqu* that women must not inherit the thron after the death of Charles IV. *le Be* 1322-28, Edward III. of England vainl claimed the throne as nearest heir b his grandmother Isabelle. The *l* *salique* was enforced for the third tim and Philip of Valois, 1328-50, cousin o the last three kings, succeeded.

House of Valois, 1328-1589.—Th rivalry between the kings of Englan and France had long been felt; Franc was jealous of England's power, and th Eng. kings resented the allegianc which they had to pay to France fo their continental possessions. Beside the Flemings revolted against Franc sought help from England, with who their commercial interests were boun up. Hostilities began at Cassel, 132 See HUNDRED YEARS WAR. The lon struggle ended with the Fr. victory o Castillon, 1453.

Charles VII. 1422-61, under whom th country was fully recovered from th English, was succeeded by his so Louis XI. 1461-83, a clever and cunnin prince, who contributed more than an king towards France's greatness an royal authority, though his means were not always straight and he was feared rather than loved. He crushed the great nobles, strengthened the Parliament of Paris, established provincial parliaments, encouraged printing and industry. The chief incident of his reign was his long struggle with Charles the Bold, Duke of Burgundy, a most dangerous rival. Charles the Bold was killed before Nancy, 1477; whereupon the king added Burgundy, Maine, Anjou, Provence, Guyenne, etc., to the crown, and ruled them with an iron hand. Charles VIII. 1483-98 was thirteen when he ascended the throne. In 1491 the king married Anne of Brittany, heiress of that province. By the Treaty of Etaples he bought off invasion by Henry VIII. of England. Finally, he made an epoch in history by setting off to the conquest of Naples, which he claimed as heir of the house of Anjou. This was the beginning of the Italian wars, 1494-1544. On his return Naples shook off Fr. domination.

Louis XII. 1498-1515, the new 'father of his people,' enforced the Ordonnance de Blois, by which the *baillis*, *prevots*, and *senechaux* had to have a degree in law, instituted Parlements in Provence and Normandy, diminished the taxes, and yet increased the finances. The peasant's property was protected; agriculture and commerce prospered. Unfortunately, the king resumed the Italian wars, and besides Naples claimed Milan. Milan was conquered twice, and La Trémouille left to govern it. Naples was subjugated with help of Ferdinand of Aragon, but French and Spanish disagreed, France was defeated at Cerignola and Garigliano, 1503, and Naples was lost again. Louis XII. foolishly joined the League of Cambrai against the Venetians. The allies, Pope Julius II., the Swiss, Ferdinand of Aragon, Henry VIII., and Maximilian formed the Holy League, 1511, against him. Louis XII. was victorious at Ravenna, 1512, but was again forced to make great concessions to his neighbors. The kingdom was at last at peace when he died without sons.

His cousin and son-in-law, Francis I., 1515-46, succeeded. The Holy League had formed again, and the king commenced his reign by the victory of Marignano, 1515. The coronation of Charles V. of Austria as emperor, a dignity which Francis I. also coveted, was the signal of a long European war, the field of battle being again Italy. War was declared in 1521; finally the king himself was beaten and taken prisoner at Pavia, 1525, by Charles V. The Treaty of Cambrai, 1529, negotiated between Louise of Savoy and Margaret of Austria, gave Europe a few years' peace, during which Francis I. gave his mind to art and the organization of his kingdom. When war began again, for the fourth time, he made alliance with Soliman, Emperor of the Turks, 1541, and with the Protestants of Germany. Peace was made with Charles V. at Crépy, 1544, and with Henry VIII. at Ardres, 1546, but in 1551 war began again under Henry II. 1546-59, who also became the ally of the Turks and the Ger. Prot. princes. Francis of Guise conquered the three bishoprics of Metz, Toul, and Verdun, and won the battle of Rentz over Charles V. After that emperor's abdication his son, Philip II., defeated the French at St. Quentin, 1557, but Guise arrived in haste, took Calais, 1558, and finally the Peace of Cateau-Cambrésis, 1559, ended the first period of war with the house of Austria. Francis II. 1559-60, who had married Mary Stewart, reigned only one year.

Francis I. and Henry II. had been the allies of the Ger. Prot. princes against the emperor, but would not tolerate heresy at home. The Protestants, however, were becoming numerous in France. At their head were many nobles, including Admiral Coligny. At the head of the extreme Catholics were the Guises. Between these parties were the *Politiques* among whom was Catherine de' Medici, widow of Henry II., mother of the three kings, Francis II., Charles IX., and Henry III. Under the young king, Francis II., the Guises governed.

Catherine de' Medici, regent for her son, Charles IX. 1560-74, seemed in her ambition and cunning to favor all parties alike. She sent Mary Stewart back to Scotland and assembled the useless *Colloque de Poissy*, in which Catholic and Prot. doctors were to discuss the different points of faith. It did not prevent eight sanguinary Religious Wars, 1562-94. In the first war Antoine de Bourbon died, leaving the kingdom of Navarre to his young son, Henry of Béarn, later Henry IV. Catherine de' Medici had arranged Henry of Navarre's marriage with her daughter, Marguerite, and when all the Protestants were in Paris for the marriage feast, the Massacre of St. Bartholomew, Aug. 24, 1572, took place; Coligny and many others were killed. The massacres went on in the provinces, and the Protestants who had escaped began the fourth war. Henry III. 1574-89, was little able to face the situation. Henry of Guise defeated the Protestants, headed by Henry of Navarre and the Duke of Alençon, the king's brother, at the battle of Dormans. The queen, nevertheless, signed the Treaty of Loches in favor of the Protestants. The Catholics, greatly incensed, formed *La Ligue*. Henry III.

had no son, and the *Ligueurs* wished Henry of Guise to succeed. Henry III., who disliked Guise as a rival, favored Henry of Navarre, and the eighth war, named *Guerre des Trois Henris*, began. Henry of Navarre won at Coutras, Guise at Vimory and Auneau, and besieged Paris; after the day of Barricades, 1588, the king called the States-General at Blois. As they also were in favor of Guise, Henry III. caused him to be murdered. This act increased Henry's unpopularity; Paris and other towns shut their gates against him. He and Henry of Navarre had their camp at St. Cloud, and were besieging Paris when Henry III. was murdered.

The House of Bourbon 1589-1792.—Henry of Navarre, who became Henry IV. 1589-1610, was abandoned by the royal army, and went to Dieppe to meet reinforcements sent by Queen Elizabeth of England. He won the battles of Arques, 1589, and Ivry, 1590. The people were utterly weary of civil war; Henry saying that 'Paris was well worth a Mass,' avowed himself a Catholic. The *Ligue* was dissolved and the great Wars of Religion finished. The king signed the Edict of Nantes, 1598, giving the Protestants rights of public worship in cities and places where worship had been held in 1596-7, and in additional cities; full liberty to dwell anywhere in the royal dominions; admission without distinction of religion to universities, colleges, and hospitals; permission to establish schools and rights of burial in consecrated ground, together with the right of having six Protestants among the sixteen councillors of the 'Chamber of the Edict' in the Parlement of Paris. In 1598 he signed the Peace of Vervins with the Spanish. The territorial unity of France was restored, and absolute monarchy came to its climax. Henry was full of great schemes when he was murdered by François Ravaillac.

Louis XIII. 1610-43 was practically under tutelage till 1617, when Concini, the favorite of the queen-mother, was murdered. His personal influence was overshadowed by the genius of his great minister Richelieu, 1624-42, whose double aim was (1) to centralize and unify all France under the crown, and (2) to establish France as the dominant power in Europe. He took La Rochelle, but by the Peace of Alais granted religious freedom. Abroad he had to combat the allied houses of Spain and Austria. In Germany he helped Gustavus Adolphus diplomatically during the early periods of the Thirty Years' War, 1618-48, and in 1635 made France join openly in the 'French' or fourth period. He and Louis XIII. drove the Spanish from Picardy, 1636, and took Arras, Artois, Alsace, minus Strasbourg, the islands of St. Margaret and St. Honorat, St. Jean de Luz and Roussillon, 1641-2. In 1643 Condé, Duke of Enghien, *le Grande Conde*, won the battle of Rocroi against the Spanish; he and Turenne were successful at Freiburg and Nordlingen, Condé again at Lens. Austria had to sign the Treaty of Westphalia, 1648, which marked the first decline of the Span. Empire. France occupied Lorraine; her frontiers touched the Rhine.

The reign of Louis XIV. 1643-1715, is the longest in France. During his minority his mother, Anne of Austria, was regent. Mazarin, who had succeeded Richelieu, was unpopular as an Italian, and nobles and Parlement, repressed by Richelieu, joined in the civil war of the Fronde. The defeated Frondeurs either flocked to the court and Mazarin or were exiled. During the civil war Spain had again attacked the N. and E. of France. Turenne won the battle of the Dunes, and the Treaty of the Pyrenees was made, 1659. Louis XIV. married the Infanta Maria Theresa, daughter of Philip IV. of Spain. After Mazarin's death, 1661, Louis showed great activity, common sense, and dignity, and was fortunate in ministers and councillors. Colbert reorganized the finances. After the Peace of the Pyrenees, France enjoyed sixteen years' peace.

There followed (1) the War of Devolution, 1667. At the death of Philip IV. of Spain, Louis XIV., according to the right of 'devolution,' claimed the Span. Netherlands for his wife, Maria Theresa. He was at first victorious, with the help of Condé; but the Dutch called England and Sweden into the Alliance of the Hague and Louis XIV. was obliged to sign the Treaty of Aix-la-Chapelle, 1668, which only left him Fr. Flanders. (2) War with Holland, 1672-8. These constant wars, by which France became famous, left her exhausted at the close of the 'grand monarque's' reign, and this exhaustion was one of the causes of the French Revolution. The valiant resistance of William of Orange saved the Dutch Netherlands, and when the Peace of Nimeguen, 1678, was signed, Spain paid for all. She conceded to France towns in the E. and N.—Valenciennes, Cambrai, Maubeuge, etc., which Vauban fortified strongly as frontier fortresses. Ten years of peace followed for France; arts and literature flourished. Louis XIV. had reached the climax of his power and abused it. In 1685 he revoked the Edict of Nantes signed by his grandfather, Henry IV.; 100,000 Protestants went abroad with their money and industry. Others under Jean Cavalier, 1701, went to the Cévennes and took arms. These Camisards were reduced by the Dragonnades, and by Villars who was sent against them. This act strengthened Louis' enemies. William of Orange formed the League of Augsburg between Holland, Spain, the emperor, some Ger. princes, and, after the Revolution, England. (3) War of the League of Augsburg or Grand Alliance, 1688-97. James II. of England, whose cause Louis espoused, was beaten at the Boyne, and Tourville was defeated at La Hogue, but inland Luxembourg won the battles of Fleurus, 1690, Steinkerque, 1692, and Neerwinden, 1693. When both sides were exhausted peace was signed at Ryswick, 1697. (4) War of Spanish Succession, 1700-13, in which Marlborough and Prince Eugene inflicted great defeats on the French. Nevertheless, by the Treaty of Utrecht, 1713, the Bourbon candidate kept Spain on condition of renouncing the crown of France. France kept her limits and colonies, except Nova Scotia, abandoned to Britain, who also received Gibraltar and Minorca. The country, however, was in a pitiful state.

During the minority of Louis XV. 1715-74, his uncle, Philip of Orleans, the notorious regent, governed, and inaugurated a court reaction. Bankruptcy followed, besides a war in which the regent, Britain, Holland, and Austria, now suddenly become allies, joined against Spain. In 1733 the aged Cardinal Fleury, the new minister, took the part of the king's father-in-law in the War of the Polish Succession, ended by the Treaty of Vienna, 1738.

After a short peace, the War of the Austrian Succession, 1741-48, broke out. France took no active part until its later stages, but it cost her 1,200 million francs. Louis XV. had quitted himself well on the battlefield, and become popular, but his education had been deplorable; he retired to Versailles and led an indolent life, ruled by Mme. de Pompadour, Mme. du Barry, and other mistresses whom he allowed to meddle in state affairs. His invaluable minister, Choiseul, tried to prevent the disasters of the Seven Years' War, 1756-63, but fell before a court intrigue. Choiseul worked the *pacte de famille*, 1761, between the Bourbons of France, Spain, and the two Sicilies, but Louis XV. had to accept the disastrous Treaty of Paris, 1763. France recovered some of the West Indies and places in India, but gave up Louisiana to Spain, who ceded Florida to Britain, Canada to Britain, and promised to pull down the port of Dunkirk.

At his death Louis XV. left to his grandson, Louis XVI. 1774-92, a kingdom lowered in the eyes of Europe, with court intrigues, religious quarrels, increasing taxes, and parlements ready to oppose royalty. The philosophers were writing against institutions and abuses, and disturbing the people's minds. The new king was honest and patriotic, but had not strength for this crisis. There was no social equality in the division of land, taxes, trades, etc. In 1775 Louis XVI. very unwillingly was drawn into the Amer. War of Independence, 1775-83 by the enthusiasm of his nobles. La Fayette and Rochambeau went to fight under Washington. The Fr. fleet won victories, and by Treaty of Versailles, 1783, France recovered her colonies of Senegal, West Indies, and India, and the freedom of others, and was allowed to rebuild Dunkirk's fortifications, while Britain lost Minorca; finances were in a worse state than before. Calonne, then Brienne, tried to raise new taxes, parlement resisting. Queen Marie Antoinette, daughter of Maria Theresa of Austria, who was of Brienne's party, was publicly insulted. Louis XVI. recalled Necker, who then assembled the States-General, 1789, in which the people had double the number of representatives of the nobles or the clergy. In a preparatory meeting, the 'Principles of 1789' were drawn up—(*i.e.*) a new constitution for France; the French Revolution had come.

The First Republic, 1792-1804, was proclaimed Sept. 22, 1792. Louis XVI. was guillotined in Jan. 1793, Marie Antoinette in Oct. The dauphin, Louis XVII., died June 8, 1795. At the news of Louis XVI.'s execution nearly the whole of Europe had made the First Coalition, and marched to the Fr. frontiers. Carnot 'organized victory.' Hoche conquered on the Rhine, 1793, Houchard was victorious against the British at Hondeschoote and the Dutch at Menin, Jourdan at Wattignies and Fleurus, 1794, and Pichegru in Holland. On Jan. 20, 1795, the four National armies entered Amsterdam, though in rags, without shoes, in the snow. In the S., Dumerbion, Masséna, and Bonaparte had taken the camp of Sorgio, 1794; Dumouriez had entered Catalonia; Moncey and La Tour d'Auvergne occupied the Basque provinces. Spain, Prussia and Holland drew out of the Coalition, and signed the Peace of Basel, 1795, which gave France the left bank of the Rhine. The civil war of Vendée had been sustained after the king's death, but Hoche subdued the last signs of revolt at Quiberon, 1795. The people of Paris rose for the last time against the Convention, Oct. 5, 1795, and were subdued by Barras and Bonaparte. The next government was the *Directory* (*Conseil des Anciens*, '*des Cinq-Cents*'), the five 'directors' being Barras, Rewbell, La

Réveillière-Lépeaux, Le Tourneur, and Carnot, 1795-9. It had to free France from invasions. Bonaparte, with Masséna, Augereau, Sérurier, and Berthier, crossed the Alps, and won the victories of Montenotte, Mondovi, Lodi, Castiglione, Arcole, Rivoli, etc. Hoche, Moreau, and Desaix fought on the Danube. Bonaparte signed with Austria the Treaty of Campo-Formio, 1797. Britain still remaining hostile, Bonaparte attacked her in Egypt. He went from Toulon, 1798, to Alexandria, was victorious at the Pyramids and entered Cairo; but Nelson defeated Admiral Villeneuve. Bonaparte, inland, won at Mont Thabor and Aboukir. All the European powers, except Spain, had now formed the Second Coalition. Bonaparte was recalled to Paris and the *coup d'etat* of '18 Brumaire' followed.

The Consulate, 1799-1804, was formed, with Bonaparte as First Consul for ten years, and Cambacérès and Lebrun as colleagues. In less than two years Napoleon reformed the services, created the Bank of France, negotiated with Rome the *Concordat*, 1801, which fixed the standing of the Church, began the *Code Napoleon*, and instituted the *Legion d' Honneur*, 1802. To face the Second Coalition he crossed the Great St. Bernard and won the battle of Marengo, 1800. An attempt in Paris to take his life, made by the Royalists through Georges Cadoudal, increased his popularity. Peace was signed with Austria at Lunéville, 1801, and with Britain, 1802.

The First Empire.—After being elected consul for life, 1802, and escaping a second attempt on his life by the same conspirators, Bonaparte accepted the senate and people's suffrage, and became emperor. Pope Pius VII. came to Paris and crowned him and his wife, the Empress Josephine, May 18, 1804. Royalists came back in numbers and resumed their titles. The emperor adopted Josephine's children by a first marriage, Prince Eugène de Beauharnais and Hortense, who married Louis Bonaparte, Napoleon I.'s brother, and was the mother of Napoleon III. Following his unsuccessful Russian and Spanish campaigns, Napoleon I. was deposed, April 1814, and Louis XVIII was called to the throne. Napoleon abdicated in favor of his son, April 20. The *First Restoration*, 1814, was accomplished, the new king signing the 'Charter of 1814,' maintaining the institution of the Revolution. The Treaty of Paris, signed with the seven powers who had been leagued against Napoleon, put back the limits of France to what they were in 1790; foreign troops evacuated the country. The new king was not popular, and Napoleon, *au fait* with what was going on, escaped from Elba, and entered the Tuileries, March 20, 1815, as Louis XVIII. was leaving for Ghent. He reigned over France for a Hundred Days (*Cent Jours*). The armies of the allies returned; Napoleon faced them, but was defeated at Waterloo, June 18, 1815, and secluded at St. Helena, where he died, May 5, 1821. Louis XVIII. 1815-24, came back—*Second Restoration*, 1815-30. By the Treaties of Vienna and Paris, France lost some places in the N. and E., and a new division of Europe was made. Louis XVIII. treated the Bonapartists with great severity, and the Royalists allowed massacres, called the *White Terror*, because of the Bourbons' white flag, in which Marshal Ney perished, Dec. 7, 1815. The king governed with ministers Richelieu, Descazes, Villèle and two Assemblies, the Chambre des Paris and the Chambre des Députés; an electoral law and a conscription Act were passed. An army was sent to Spain to put down a revolt and to restore Ferdinand VII. Charles X. 1824-30, became very unpopular by granting an enormous indemnity to the *emigres*. With his ministers he made enactments doing away with the freedom of the press, and introducing a new mode of election. Paris revolted, July 27-29, 1830. The king abdicated in favor of his grandson, the Duke of Bordeaux, whom the people refused. Under Charles X., Britain, France, and Russia won the battle of Navarino, 1827, over the Turks and established the independence of Greece.

The Chamber of Deputies elected Louis Philippe, 1830-48, Duke of Orleans, who had fought for the Revolution at Valmy and Jemappes. He took the name of 'King of the French,' accepted the Charter of 1814, and the three-colored flag. The minister Casimir Périer kept the Austrians in check at Ancona and repressed the riots in Lyons. Marshal Soult, Guizot, Thiers, and Broglie succeeded to power, and put down the Vendée, raised by the Duchess of Berry, who wanted to enthrone her son, the Duke of Bordeaux. Antwerp was taken by a Fr. army, establishing Belgian independence of Holland, Algeria was conquered, 1830-47. In 1840 the body of Napoleon was brought from St. Helena and buried amidst great excitement at Paris. The king and Guizot having refused electoral reform, revolution broke out, Feb. 24. Louis Philippe somewhat pusillanimously abdicated.

The *Second Republic*, 1848-52, was proclaimed. In 1833 primary schools had been organized. The Second Republic established universal male suffrage. Capital punishment for political offenses was abolished. Louis Bonaparte, nephew of Napoleon I., was elected president. He sent an army to Rome to restore the Pope, and made the law of 1850 giving the direction of education to the clergy and congregations. On Dec. 2, 1851 he made a *coup d'etat* and formed a new constitution which made him president for ten years.

The Second Empire.—On Dec. 2, 1852, he was made emperor as Napoleon III. 1852-70. He married, 1855, Eugénie, de Montys, the Empress Eugénie, and had a son, the Prince Imperial, killed in Zululand, 1879. Napoleon III. undertook several wars, beginning with the Crimean, 1854-6, in alliance with Britain. Peace was signed at Paris, 1856. In 1859 Britain and France made a campaign in China. In Italy 1859-60 the Count of Cavour, Victor Emmanuel's minister, induced Napoleon III., after the conspiracy of Orsini and Pietri, to help Italy against Austria. Austria gave Lombardy to the emperor, who renounced Piedmont in exchange for Savoy and the county of Nice, 1860. Later Napoleon III. helped Italy to get Venetia.

An Austrian prince was, with Napoleon's approval, made emperor of Mexico; the Mexicans revolted; France had to call back her troops, and Maximilian was killed at Queretaro, 1867. Faidherbe also extended Fr. dominion in Senegal over Cayor, Bondo, and Bambouk. In 1853-57 Randon subdued Kabylie, Algeria. In Annam, Indo-China, after the war, 1861-2, the emperor Tu-Duc had to give up to France the provinces of Saigon, Bien-Hoa, and Mytho. Three more provinces were added in 1867.

The Franco-German War took place 1870-1. After the disaster of Sedan, the ministers, Jules Favre, Gambetta, and Trochu, proclaimed the *Third Republic*, Sept. 4, 1870. The Prussians besieged Paris, Sept. 19, which surrendered through famine, Jan. 28, 1871. By the Treaty of Frankfort, May 10, 1871, France lost Alsace and Lorraine, but kept Belfort. She had, besides, to pay $1,000,000,000 to Germany. In Paris the Royalist party under Thiers did not welcome the republic; this incensed the people, who rose, March 18, 1871, and instituted the Commune, by which each local unit was to govern itself freely. That of Paris met on March 29, and made drastic alterations in the constitution, confiding the government to an executive commission of seven. The Assembly retired to Versailles, besieged and took Paris, May 28, and deported or killed the revolutionaries. But the factions were not satisfied. Theirs had to resign, May 24, 1873, after having, within three years, paid the heavy war indemnity, and sent the Germans out of the country. Marshal MacMahon was elected for seven years, 1873-9. The National Assembly retired, 1875. The Senate and Chamber of Deputies governed under a president, elected for seven years at a congress of the two chambers. MacMahon, too much inclined to the Royalists, resigned; Jules Grévy was elected president, Jan. 30, 1879. After him came Sadi Carnot, Dec. 1887, murdered at Lyons by an Ital. anarchist, Casimir-Périer, 1894, Félix Faure, 1895, Emile Loubet, 1899, Armand Fallières, 1906, Raymond Poincaré, 1913, Paul Deschanel, 1920.

Carnot's presidency saw the Boulanger incident and Panama Canal scandals (see LESSEPS). The Dreyfus case (see DREYFUS AFFAIR) occurred, 1898-9, and Fashoda incident, 1898. In 1904 France recognized Britain's influence in Egypt. At the Algeciras Conference in 1906 Morocco was practically neutralized, and Germany gained a diplomatic victory. After the *Agadir incident* there were long negotiations with Germany, and on Nov. 4 a convention was signed by which Fr. predominance in Morocco was recognized, and Germany received compensation in African territory. By Separation Law, 1905, the Church was disestablished and disendowed, official religion was abolished, no state salaries were thereafter to be paid to clerics, while religious instruction was to be gradually superseded. The episcopal palaces, presbyteries, and seminaries were confiscated to the state at the expiry of a period not exceeding five years while the churches themselves were handed over to local *associations cultuelles* in trust for public worship. The clergy refused to recognize these associations, and were expelled from their residences and seminaries, but left in possession of their churches.

Under the Third Republic many railways, canals, and ports have been constructed. The Fr. colonies have been extended. In 1879 Savorgnan de Brazza established the Fr. Congo; a Fr. Protectorate was declared over Tunis, 1881; a new expedition went to Tongking and succeeded in the taking of Son-Tay, Dec. 17, 1883, Bac-Ninh, March 12, 1884; Fr. Protectorate proclaimed over Annam; Treaty of Tien-tsin, May 12, 1884, recognized Fr. establishment in Tongking. In Sudan victories were won over Ahmadon, 1890, and Samory, prisoner of France, 1899. In 1893 Bonnier took Timbuktu. In Dahomey General Dodds captured King Behanzin 1894 and established a Fr. Protectorate. Conquest of Madagascar: General Duchesne took Tananarivo, 1895. On the Red Sea, establishment in Djibouti, 1900. In 1900 France took possession of In-Salah and In-Bahr in the oases of Tuat in S. Algeria. An alliance was made between France and Russia, 1897, to balance the Triple Alliance (Germany, Austria and Italy) and maintain peace in Europe. An Anglo-French Entente, 1904, facilitated consolidation of Fr. power in Morocco; in 1907 the Entente between Britain, France, and Russia was concluded. In 1911 a Franco-German treaty favored a Fr. protectorate in Morocco, and effected territorial changes in Africa. In 1913 the Lötschberg tunnel was opened.

The *World War*, 1914-18, began by the Ger. advance on Paris and the temporary removal of the government to Bordeaux, Sept. to Dec. 1914; early in 1915 the sale of absinthe was prohibited and restrictions put on home distillation; in Oct. a loan of $500,000,000 was secured from the U.S. In 1916 maximum prices for various commodities were fixed; in June the first Inter-allied Economic Council was held; in Sept. a second war loan was voted, and in Nov. the percentage of the income tax was raised. In Aug. 1917 the government requisitioned everything necessary for food, clothing, heat, and light; in this year the famous cases of Bolo Lenoir, Desouches, Malvy, Humbert, and Caillaux were of great interest. In 1918 a tax on luxuries was instituted; many Ger. air raids occurred, and Paris was bombarded by a long-range gun, one shell falling on St. Gervais during a Good Friday service, and killing 75 people; a 4 per cent. loan brought in 27,853,251,000 francs. The elections of Nov. 1919 gave a large majority to the Bloc National M. Clemenceau, who by the vigor of his administration had earned the name of 'Père la Victoire,' retired from the premiership, 1917-19 and from public life, and was succeeded by M. Millerand.

The end of the war left France in a lamentable position, politically and economically. Property and land had been damaged to the estimated amount of 102 billion francs, and nearly 5,000,000 of the inhabitants of the devastated area had been driven from their homes. The government set to work aggressively to remedy these conditions and help was also rendered by organizations in the United States and elsewhere. By the end of 1922 over 44 billion francs had been expended in restoring the devastated areas and practically all the inhabitants driven out had been returned. Great progress had also been made in repairing the railways, and in providing agricultural and other implements necessary for the working of the land. This work was under the direction of the Ministry of the Liberated Regions.

French representatives took an active part in all the economic and political conferences held in the years succeeding the war. At the Conference of the Limitation of Armaments at Washington she was represented by Premier Briand, who took a foremost part in the deliberations. France at this conference opposed limitation in military force and also a reduction in the strength of submarines and destroyers. See CONFERENCE ON THE LIMITATION OF ARMAMENTS. During the progress of the conference in January 1922, there was a change of ministry and Briand was succeeded by Poincairé. The failure of Germany to pay the reparations due was the chief obstacle to the financial recovery of France, and all other measures having failed, the government decided, in January, 1923, to take forceful possession of the Ruhr, as provided by the provisions of the Treaty of Versailles. See REPARATIONS; RUHR. WORLD WAR.

While France did not suffer as much as some of the other countries of the continent by the inflation of currency, the franc declined to a point where not a little suffering and great uneasiness resulted. Industry, however, revived to such a point as to warrant the belief that France would make a complete recovery in the course of time from the hardships resulting from the war.

For Peace Conference at Versailles, see PEACE CONFERENCES.

FRENCH LITERATURE.—French literature begins when the *Langue d'Oil* (dialect of the N.)and the *Langue d'Oc* (dialect of the S.) are definitely shaped; latter was employed by *troubadours* in Provence, former by northern *trouveres* in Fr. literature proper. Political, legal and religious documents are found in early times in prose in vernacular, but pure literature commences and for long time continues in verse only.

Poetry in the Middle Ages.—The earliest form, *cantilena* (*chant*), parent of the later *chanson*, is supposed to have existed in 7th cent., but first that remains is song of *Ste. Eulalie* (10th cent.); metrical lives of the saints followed, and led way to 11th cent. lives of the heroes, or *Chansons de Geste* (*i.e.*, of deed), which form a cycle of stories about Fr. heroes, chief of whom was Charlemagne; the glory of early Fr. literature, the *Chanson de Roland*, was first discovered at Oxford in 1837. Romances followed as epic poems; romances of the Arthurian cycle, which came into being in Brittany in 12th cent., were turned into prose at close of century by Chrestien de Troyes The Cycle of Antiquity is name given to those of the *genre* of same period which took classic themes; Benoît de St.-More, who wrote the *Roman de Troie,* is supposed to have been also author of *Romans* of Æneas and Thebes; *Alexandre,* by Lambert le Tors and Alexandre de Bernay, and *Julius Caesar* are famous examples. Early chronicles also took form of poems; Wace wrote *Brut* (*Estoire des Bretons*) before 1155, and *Rou* (*Geste des Normans*), 1164-70; Jordan Fantosme's chronicle of war between Henry II. and his son was written 1173-74, the valuable *Thomas a Beckett* of Garnier de Pont Sainte-Maxence, 1177.

The Fabliaux were a characteristic form of 12th and 13th centuries; translations or imitations of Æsop's fables, they were the vehicle of worldly wisdom and humor of the time, and so parent of important forms of later literature; example, *Le Vair Palfroi.* Eastern stories were versified as in *Sept Sages.* The Fox Cycle (*Roman de Renart*) of 13th cent. is an important body of poems of amusing and didactic nature; love of allegory, satire, and a frank naturalness are shown in great poem of early 13th cent., the *Roman de la Rose,* by Guillaume de Lorris, completed by Jean de Meung, 1250-*c.* 1305; pre-Renaissance pagan spirit in *Aucassin et Nicolette,* 13th cent., author unknown. Verse was to the Middle Ages the most obvious way of conveying instruction; *castoiements* (chastisements, principles) were drawn up for guidance of youth, while Robert de Blois penned *Le Chastiement des Dames. Bestiaires, lapidaires,* and *volucraires* gave technical matters in form easy to remember, and correspond to the weather folk-lore and other rhymes still handed down in England. Most important class of all is Lyric Poetry, in its varieties of *sirventes, jeux-partis, motets, lais, virelais,* and *pastourelles*; Audefroi le Bastard and Marie de France, 12th cent., Thibaut de Champagne, Rutebœuf, and Adam de la Halle, 13th cent. are chief early lyric poets.

Drama.—Miracle plays commenced 12th cent.; poem of Adam de la Halle, *Robin et Marion,* pastourelle in dialogue, led later to genuine secular drama. The Miracles of Notre Dame, 14th cent., form forty-three plays; from 1450 the Miracles were called *Misteres,* and may be divided into three cycles: *Old Testament, New Testament,* arranged in three parts by Arnoul and Simon Greban about 1450, and *Saints.* In the 15th cent. appeared the *Moralites, farces,* and *sotties*; a masterpiece is farce of the *Avocat Patelin,* author unknown. The Miracles were acted in 15th cent. by the *Confrerie de la Passion* and the secular plays by the *Clercs de la Basoche* From 1548 the two societies joined.

Prose in Middle Ages.—Prose, used in earliest times for legal purposes, first commenced to be employed for *belles-lettres* in chronicles, usually written in verse or Lat. prose; Geoffrey de Villehardouin, 1160-1213, wrote first Fr. history in vernacular in description of Fourth Crusade. Joinville, 1224-1317 left a *History of St. Louis*; first manuscript was lost, but a learned editor, Natalis de Wailly, reconstituted it from his notes. *Les Grandes Chroniques de St. Denis,* begun in 13th cent., under Mathieu de Vendôme, abbot of St. Denis, and continued by laymen, are annals of kings of France to crowning of Louis XI.—called later *Grandes Chroniques de France.* Froissart, 1337-1410, the greatest historian of Middle Ages, dealt with period 1352-1410.

Renaissance.—One of greatest periods of Fr. literature is that of the Renaissance, which affected France long before England; Fr. period, indeed, came to an end soon after Eng. period, the age of Shakespeare, began; France at this time was literary leader of Europe.

Poetry.—The poetical movement was carried out by the *Pleiade,* seven literary stars—Ronsard, 1524-85; Joachim du Bellay, 1525-60; Jean Daurat, 1508-88; tutor of Ronsard, Etienne Jodelle, 1532-73; Rémy Belleau, 1528-77; Jean Antoine de Baïf, 1532-89; and Pontus de Tyrad, *d.* 1605—who formulated a new poetical creed, and, while adopting much from the classics, tried every poetical experiment and obtained wonderful grace and ease of form. The *Pleiade's* aims are set forth in Du Bellay's *Defense et Illustration de la Langue Francaise,* 1549; a vast classical importation of words and fancies constituted a permanent contribution to Fr. culture, although much of their coining was subsequently repudiated.

Drama.—Jodelle had the task of renovating drama; *Cleopatre,* 1552, and *Didon,* though of little value, had great influence on future tragedy through choice of subject, fewness of characters, and observation of three classical unities. Jacques Grévin, *c.* 1540-70; Robert Garnier, 1545-1601; Antoine de Montchrestien, and Pierre Larivey developed tragedy and comedy on classical lines.

Prose.—John Calvin, 1509-64, has often been called the father of Fr. prose; he set example of clearness, lightness, great result obtained with least means, and absolute absence of the forced note—qualities which have remained distinctions of his tongue; his *Institution of Christian Religion,* 1536, then unparalleled in style, was less representative of the century than works of that great Fr. writer of its close, Montaigne, 1533-92, the parent of much in Shakespeare, and still a mine for literary men and philosophers; his *Essais*, begun in 1572, treat of everything—God, religion, politics, poetry, manners, virtues, vices, dress, trade, his own life and travels, and especially his friendship with La Boëtie, with little arrangement or order. Saint François de Sales, 1567-1622, Bishop of Geneva, founded in Annecy, Savoy, the *Academie Florimontane*, whose emblem, an orange tree in bloom, is applicable to his style, exquisitely flowery and graceful. Never since the *Imitation* had a devotional book become so popular as his *Introduction a la Vie devote*, 1608, and *Traite de l'Amour de Dieu*, 1614. Translations of Amyot, 1513-93, Bishop of Auxerre, among them Plutarch's *Lives*, were and are considered models of style. Of great political importance in its time was the *Satire Menippee*, 1594, which ridiculed the Ligue and did much to secure the throne for Henry of Navarre. It is a pamphlet composed by six very grave and learned *bourgeois* of Paris: Jacques Gillot, Nicholas Rapin, Jean Passerat, Florent Chrestien, Pierre Pithou, and Gilles Durant; conceived and drafted by Pierre le Roy, canon of Rouen. Jean Bodi 1530-96, was a noted political theorist.

First Half of the 17th Century.—The happy classical and romantic blend of 16th cent. gave place to severer classicism under what is now felt to have been the evil influence of Malherbe, 1555-1628, a reformer who thought to reform Fr. language and versification vitiated by Ronsard. As a matter of fact, he merely made a choice amongst the forms left by Ronsard, omitting some excellent ones which have been taken up with success by modern poets, but he arrested poetical movement. Products of the early 17th cent. are the drama, which commences its great age, miscellaneous prose, beginnings of academy and *salon* movement. The Académie Française 1635, under the patronage of Richelieu, had for its object to fix the language; Conrart, 1603-75, was its originator; the first edition of the *Dictionnaire de l'Academie* came out in 1694, the seventh in 1878; a grammar was written by Régnier Desmarais, 1705. Vaugelas, 1585-1650, the chief grammarian of the classical period, with Malherbe, the Hôtel de Rambouillet, the Académie Française, and J. G. Balzac, 1597-1654, did most towards forming the Fr. language of 17th cent.; J. G. Balzac created *prose oratoire*, endowing the Academy with a prize for the subject.

The Drama.—Pierre Corneille, 1606-84, is father of Fr. tragedy; chief works, *Le Cid*, 1636; *Horace*, 1640; *Cinna*, 1640; *Polyeucte*, 1643, which met with great success, thanks to the good taste of the public; he and Rotrou, 1609-50, his friend, inspired Racine, Molière, Quinault, Regnard, and others.

Prose.—Prose, like the drama, flourished as poetry decayed. Descartes, 1596-1650, and Pascal, 1623-62, were both masters of style and of metaphysics; Descartes' *Discourse on the Method of using the Reason*, 1637, introduced philosophy in the vernacular; it met with instant recognition; chief thinkers of time were the Cartesians: the Académie des Sciences, 1666; Cartesian at its foundation, later became Newtonian. Pascal is intimately connected with Port-Royal, an abbey of Bernardines, near Paris, founded 1204 and reformed 1602 by the Abbess Angélique Arnauld, sister of Antoine Arnauld, 1612-94, *le grand Arnauld*. The religious house was removed to Paris, 1626, and the original abbey, Port-Royal-des-Champs, became residence of learned men, mostly friends and relatives of Arnauld, all Jansenists; they formed a remarkable school. Pascal published his *Lettres Provinciales* to defend the Port-Royal Jansenists against the Jesuits in French so that everybody might follow the debate; his *Pensees* is also a masterpiece of Fr. prose. Mézeray, 1610-83; Mme. de Scudéry, 1607-1701; Cyrano de Bergerac, 1620-55; and Sully, 1560-1641, left much of interest in history, novels, and memoirs.

The Age of Louis XIV.—The period 1660 to 1715 is called *Le Siecle de Louis XIV.*, because that king exercised an influence marked, though indirect, on contemporary writers; masterpieces crowded in during his reign.

Poetry and Drama.—Boileau, 1636-1711, in his *Art Poetique*, 1669-74, satires, etc., laid down, in admirable style, laws of verse. Very different from his expressive classicism was the work of La Fontaine, 1621-95, whose *Fables*, an 'ample comedy with a hundred different acts,' develop one of the best mediæval kinds of verse. Another comic spirit, of wider range, but tied in classical bonds, is Molière, 1622-73, one of France's greatest names. His excellence is in width of view, tolerance of judgment, a great comic spirit, and pure sense of fun. It has been objected that *Les Precieuses Ridicules*, 1659; *Les Femmes Savantes* 1672; *Le Bourgeois Gentilhomme*, 1670; *Le Malade Imaginaire*, 1673, amusing as they are, are types, not people; but *Le Misanthrope*, 1666; *Tartufe*, 1667, and *L'Avare*, 1668, are immortal portraits with no undue exaggeration. Racine, 1639-99, the great tragic poet, introduced innovation of simple plot, in which the hearer's attention is kept only by interest of characters and beauty of verse, and enriched literary language by using common words. Among lesser dramatists is Thomas Corneille, 1625-1709.

Prose. — Preachers and theologians held a prominent place in Louis XIV.'s time; of them Bossuet, 1627-1704, was the greatest orator and most productive genius. His *Sermons* are monuments of eloquence. Among the many aphorists of the salons who aimed at brilliance, La Rochefoucauld, 1613-80, with his *Maximes* from 1665, was strikingly successful; La Bruyère, 1645-96, left his *Caracteres*, 1688, miniatures which are, with the *Lettres* of Mme. de Sévigné 1626-96, faithful pictures of the late 17th cent. Two other women here deserve mention—Mme. de la Fayette, 1633-96, for her novel, *La Princesse de Cleves*, important as the beginning of modern writing, and Mme. de Maintenon, 1635-1719, whose *Correspondance* Napoleon I. preferred to that of Mme. de Sévigné. *Memoires* are represented by Cardinal de Retz, 1614-89, and by Saint-Simon, 1687-1755, whose *Memoires*, only revealed at the time of the Revolution, are a vivid account of the court of Louis XIV., and provide the moralist with many excellently expressed reflections. Charles Perrault, 1628-1703, started the *Querelle des Anciens et des Modernes*, 1670-1720, in a poem, *Le Siecle de Louis le Grand*, read before the Academy. He wrote exquisite *Contes*, 1697, which include old fairy stories—Puss in Boots, Cinderella, etc.

The 18th Century.—The 18th cent. may be divided into four periods: (1) till the end of Louis XIV.'s reign; (2) 1715 to 1750; (3) 1750 to the Revolution; (4) the Revolution.

(1) The poetic output of 18th cent. is negligible, but the first years are a time of transition. Regnard, 1655-1709; Fontenelle, 1657-1757; Jean-Baptiste Rousseau, 1670-1741, and others still write good poetry compared with that of their followers; Regnard's style may claim some of Molière's qualities; Fontenelle, a *moderne*, had the merit of making the Academy and its works known to the public in *Histoire* de l'Academie des Sciences, from 1697, and *Eloges des Academiciens*, 1708, and inculcating necessity of good style in works of science. Le Sage, 1668-1747, by *Gil Blas*, 1715-35, attained very high rank amongst painters of character, observers, and analysts of manners and passions. Memoirs continued to be excellent throughout the cent.; among early ones are *Souvenirs* of Mme. de Caylus, 1673-1721, niece of Mme. de Maintenon, and *Memoires* of Mme. de Staël-Delaunay.

Vauvenargues, 1715-47, wrote *Reflexions et Maximes*, 1746, as a counterblast to La Rochefoucauld, his *Caracteres* and *Dialogues* had merit and some vogue. Louis Racine, 1693-1763, wrote poems which belong in kind to earlier period, and more valuable Memoirs of his famous father, Jean Racine. Some writers of comedies kept the 17th cent. manner; Marivaux, 1688-1763, in amusing style called *Marivaudage*, produced original plays—(*e.g.*) *Jeu de l' Amour et du Hasard*, 1730—besides his delightful novels; Gresset, 1709-77 wrote *Vert-Vert* 1734, and *Le Mechant*, 1749, with some observation of character, but weak plots.

Jean-Jacques Rousseau, 1712-78, contributed perhaps as much as Voltaire to overthrowing the old monarchy and bringing about the Revolution, and his doctrine of 'return to Nature,' one of the main themes of Romantic movement, had great influence on subsequent literature; his theories on education are expressed in *Emile*, 1762, on politics in the *Contrat Social*. Diderot, 1713-84, who founded the *Encyclopedie*, 1751-80, and D'Alembert, 1717-83, who aided in the production, exercised great influence on science, but the latter soon retired in fear of the authorities. An example of the combined scientist and stylist is Buffon, 1707-88, author of the saying, 'Style is the man'; he composed an encyclopædic *Natural History*, 1749-1804; his *Discours sur le Style*, on being admitted to the Academy, 1753, is both precept and example. Gilbert, 1751-80, one of the few poets, wrote *Le dix-huitieme Siecle*, 1775, and *Adieux a la Vie*, more poetical than anything his age had yet produced. Marmontel, 1723-99, and La Harpe, 1739-1803, inspired by Molière, show the faults of nearly all his followers. The *Salons* flourished under Mme. de Lambert, 1647-1733; Mme. de Tencin, 1681-1749; Mme. du Deffand, 1697-1780; Mme. de Lespinasse, 1731-76; Mme. Geoffrin, 1699-1777; and Mme. Necker, 1739-94.

The 19th Century.—Mme. de Staël, 1766-1817, applied the term Romantic Movement to the anti-classical revolt which now ensued. Chateaubriand, 1768-1848, pupil of Rousseau, in *Le Genie du Christianisme*, 1802, attacked doctrines of the last hundred years, upheld Christianity as source of art and poetry, and did justice to the Middle Ages for first time since the Renaissance. *Atala* and *Rene* episodes in the book contain fine descriptions of the New World. *L'Itineraire de Paris a Jerusalem*, 1811, is first thing of its kind; *Les Martyrs*, 1809, continued the *Genie du Christianisme*. Mme. de Staël, author of the once famous *Corinne* 1807, clung to the old school but coquetted with the new; her *De l' Allemagne* 1810, helped the movement by describing

Germany, and started modern historical and literary criticism. Joseph de Maistre, 1754-1821, was a mediævalist even more ardent than Chateaubriand, as he showed in *Considerations sur la France*, 1796, and *Essai sur le Principe Generateur des Constitutions politiques*, 1810. Joubert, 1754-1824, Chateaubriand's friend and literary adviser, wrote polished *Maximes, Essais, Lettres*. The Abbé de Lamennais, 1783-1854, a leader in this religious revival, wrote fiery, eloquent *Essai sur l'Indifference en Maitere de Religion*, 1817; his opinions were censured by Rome, 1832, and after leaving the Church he penned *Paroles d'un Croyant*, 1834. The Dominican, Lacordaire, 1802-61, one of the greatest orators of the century, left admirable *Conferences*, 1835-50.

Poetry.—A. Lamartine, 1790-1869, also deeply pious, was one of the first poets of Romanticism; in pure lyric gift he was far surpassed by Beranger, 1780-1857, but neither of them really represents the new movement, of which Victor Hugo, 1802-85 is the first great exponent; production of his play *Hernani*, 1830, marked crisis of movement. Hugo is first of series of poets who restored Fr. poetic repute; since days of mediæval *Chansonnier* France had produced little pure poetry; though she had led the world in prose; now comes another great poetic epoch. Théophile Gautier, 1811-72, the poet of the perfect ear, was a romantic and classicist blended, and his *L'Art* is a model of writing as well as much-quoted expression of poetic creed; same masterly style in stories, *Italie*, 1852; *Voyage en Russie*, 1866. Gautier, Banville, Leconte de Lisle, and Baudelaire, 1821-67, the moon of the movement, were the elder members of the *Parnassiens*, one of the first societies to branch off, under auspices of Ricard and Catulle Mendès, 1841-1909, from the Romanticists; chief among the *Parnassiens* are Sully Prudhomme, 1839-1907; Villiers de l'Isle-Adam, 1840-89; François Coppée, 1842-1908; Mallarmé, 1842-98; Paul Verlaine, 1844-96; later *Symbolists* include several of above names, that of the boy Rimbaud, 1854-91, who started movement with *Le Bateau Ivre*, 1871; Hérédia 1842-1905; graceful poet, Léon Dierx *b.* 1838; Paul Fort, *b.* 1872, etc.; although Jean Richepin, *b.* 1849, and others still keep poetry alive, signs now appear that the poetic outburst is over, and that France has once more entered on a great prose period.

Drama.—Victor Hugo laid down rules for Romantic drama in preface to *Cromwell*, 1827, but did not observe them; his plays were not so well received as the *Othello*, 1829, and *Chatterton*, 1835, of Alfred de Vigny, or as historical plays of Dumas *pere*, 1803-70 whose *Tour de Nesle* is a little masterpiece of horror of the kind dear to the school. On the whole, the Romantic historical drama was a failure. Eugène Scribe, 1791-1861, obtained success with light, amusing comedies cleverly staged. Among many dramatists may be mentioned Augier, 1820-89, author of amusing comedies, Dumas *fils*, 1824-95, writer of popular moralizing dramas, Sardou, 1831-1909, whose problem plays tend to sink by their own weight, Pailleron, 1834-99, author of *Le Monde ou l'on s'ennuie*, and Rostand, 1868-1918, whose poetical dramas owe so much to the Coquelins; the hypercritical find Rostand rhetorical, and Paris was both bewildered and angered by *Chantecler*. See also DRAMA.

Fiction steadily developed throughout the century and has now become principal Fr. aim. Hugo, who led the way, Dumas, who has interest rather of plot than style, and George Sand, also a distinguished pioneer, have not the characteristics which are the chief ornaments of Fr. prose style; authors of the next generation are Octave Feuillet, 1827-90, who followed George Sand; Gustave Flaubert, 1821-80; Edmond de Goncourt, 1822-96; Jules de Goncourt, 1830-70, all three 'precious' writers, Daudet, 1840-97, who to real wit and pathos united emotionalism; Edmond About, 1828-85, whose best works, such as *Le Roi des Montagnes*, are classics of comedy, the mighty figure of Zola, 1840-1903, who threw needful ballast into the ship of fiction, his disciple Huysmans' *b.* 1848, a decadent realist; 'Pierre Loti, *b.* 1850, who, again, sins on the emotional side, the Catholic and conservative Paul Bourget, whose *Le Disciple* is a triumph of the psychological novel, the witty, malicious Maupassant, 1850-93, who reached the high-water mark of style, and his successor, Anatole 'France' Thibault, *b.* 1844, the greatest living Fr. man of letters.

Other Prose Writers.—The Restoration of 1815, which restored freedom of tribune, produced distinguished orators; under Louis Philippe, Guizot and Montalembert shone. Victor Cousin, 1792-1867, represents philosophy, little treated, as such, during the century, by his *Du Vrai, du Beau et du Bien*, 1853, and other works. History is strong, both in the old form of treatment as a branch of *belles-lettres* and in the new scientific method; important names are Guizot, 1787-1874, eloquent in writing as in speech, his disciple, Tocqueville, 1805-59, Thiers, 1797-1856, the statesman, Mignet, 1786-1884; Augustin Thierry, 1775-1856; Michelet, 1798-1874, who wrote one of the best histories of the Revolution, and Henri Martin, 1810-84, important member of the new school. Fustel de Coulanges, 1830-89, won fame with *La Cite Antique*; Renan, 1823-92, employed an excellent style in the service of the Higher Criticism with strong anti-theological bias; Taine, 1828-93, did brilliant work in study of history of institutions; followed by Lavisse, *b.* 1842, Broglie, 1821-1901; Thureau-Dangin, 1837-1913; Houssaye, 1848-1911; Hanotaux, *b.* 1853; Gaston Bossier, 1823-1908, holds prominent place as writer of Roman lives. Prominent among literary critics is Sainte-Beuve, 1804-69, whose *Causeries du Lundi* are valuable. Later still are Ferdinand Brunetière, 1849-1911; Emile Faguet, 1847-1916; Jules Lemaître, 1853-1914; and Francisque Sarcey, 1828-99, themselves masters of style.

The outstanding fact in second half of 19th cent. is the rise of naturalism as a reaction against romanticism. In all branches there are writers too numerous to mention. See separate articles.

FRANCE, ANATOLE (1844), Jacques Anatole Thibault, greatest figure in contemporary Fr. literature; at Collège Stanislas imbibed knowledge of Greek and Roman antiquities which he displays in many of his stories; turned in 1876 from poetry to prose of finest class. character, the pure mirror of Fr. intellect, wit, and urbanity. Amongst his most famous works are *Le Crime de Sylvesire Bonnard*, 1881; *Le Livre de mon Ami*, 1885; *Thais*, 1890; *L'Etui de Nacre*, 1892; *La Rotisserie de la Reine Pedauque*; *Les Opinions de M. Jerome Coignard*, 1893; *Le Lys Rouge*, 1894; *Pierre Noziere*, 1899; *Sur la Pierre blanche*, 1905; *Vie Jeanne d'Arc*, 1908, replied to by Andrew Lang; *Les Sept Femmes de la Barbe Bleue*, 1909; *La Revolte des Anges*, 1914. His philosophy appears to be purely negative and agnostic, but taken as a whole his work is the largest contribution to humanist criticism since Voltaire.

FRANCE, JOSEPH IRWIN (1873), physician. He graduated from Hamilton College, N.Y. in 1895, and also studied at Clark University and at Leipsig, Germany. Entering the College of Physicians and Surgeons, he received the degree of M.D. in 1903. He practiced medicine in Baltimore and also engaged in finance and farming. From 1905 to 1909 he was a member of the Maryland Senate, and in 1917 became U.S. Senator from Maryland, serving till 1923, but was defeated for re-election.

FRANCESCHINI, BALDASSARE (1611-89), Ital. artist; famed for frescoes.

FRANCESCA DA RIMINI, a daughter of Guido da Polenta, Lord of Ravenna. She was given in marriage to Giovanni the Lame (Gianciotto or Sciancato), son of Malatesta, Lord of Rimini, when peace was concluded between the houses of Ravenna and Rimini. The elder brother of Giovanni, Paolo the Handsome, was sent to Ravenna to fetch Francesca, and the two fell in love with each other. Giovanni found them together (*c.* 1285), and killed them both. The story, which has many modifications is treated in Dante's *Inferno*, and also in literature by Leigh Hunt, Silvio Pellico, and Stephen Phillips, and in art by Ingres, Ary Scheffer, G. F. Watts, and Cabanel.

FRANCHE-COMTÉ (47° N., 6° 20′ E.), old Fr. province in Rhône basin on Swiss frontier; ancient capital, Besançon; now comprised in departments of Doubs, Haute-Saône, and Jura; conquered by Cæsar; later part of Burgundy; split into four countships in Middle Ages; annexed to France, 1678.

FRANCHET D'ESPEREY, Fr. general; first became prominent as leader of Fr. troops in Algeria; commanded 1st Fr. Army Corps at Charleroi, and 5th Fr. Army at the battles of the Marne and Aisne. Later he commanded an army group that saw much heavy fighting in Champagne. On June 19 1918, he succeeded Guillaumat as commander-in-chief of the Allied armies in the Balkans, and on Sept. 16 of the same year opened the offensive which forced Bulgaria to sue for peace. He was one of the signatories of the Armistice, Sept. 29, 1918.

FRANCHISE, a right or privilege; the right to exercise suffrage or a vote.

FRANCIA, FRANCESCO DI MARCO DI GIACOMO RAIBOLINI (1450-1517), Ital, artist; his *Pieta* (in the National Gallery) one of the noblest in all the Italian achievement.

FRANCIA, JOSÉ GASPAR RODRIGUEZ (*c.* 1757-1840), Paraguayan statesman; became dictator of Paraguay, 1814, holding office till death.

FRANCIS I. (1708-65), Grand Duke of Tuscany and emperor of Holy Rom. Empire.

FRANCIS II (1768-1835), last emperor of Holy Rom. Empire, first emperor of Austria (Francis I. of Austria); in wars against Napoleon lost Netherlands, Lombardy, Venetia, and other provinces; became Austrian emperor, 1804; renounced Holy Rom. Empire, 1806; after battle of *Leipzig* regained Lombardy, Galicia, and Venetia, by Treaty of Vienna, 1815.

FRANCIS I. (1494-1547), king of France; conquered Milan by defeat of Swiss mercenaries at *Marignano*, 1515; unsuccessfully contested imperial crown; henceforth bitter rival of successful candidate, Charles V.; failed to gain England's support at Field of Cloth of Gold, 1520; defeated and taken prisoner at *Pavia*, 1525; resigned Ital. possessions by Treaty of Madrid, 1526; allied himself with Turks, 1534; finally made peace with Charles, 1544; promoted Renaissance, founded Collège de France.

FRANCIS I (1777-1830), king of the Two Sicilies.

FRANCIS II. (1836-94), king of Naples and Sicily; defeated by Garibaldi in 1860-61, after which Naples was united to Italy.

FRANCIS FERDINAND, ARCHDUKE (1863-1914), eldest son of Emperor Francis Joseph's brother; became heir to the Dual Monarchy on the death of Crown Prince Rudolph, 1889; thereafter turned to serious pursuits; visited Egypt, India, Australia, China, Japan, Canada, and U.S.; in 1900 contracted morganatic marriage with Countess Sophia Chotek of ancient nobility of Bohemia, who was subsequently created Duchess of Hohenberg; was looked on as strong man of Austria and credited with desiring to extend Austrian territory to Salonica; murdered at Serajevo, June 28 1914, thus furnishing Austria with occasion to launch ultimatum against Serbia which led to World War.

FRANCIS JOSEPH (1830-1916), Emperor of Austria and King of Hungary; succeeded his uncle Ferdinand in 1848. Soon after his accession war broke out with Hungary, which was subdued with the aid of Russian troops. Simultaneously he also triumphed over the insurgents in Italy, and thereafter he proceeded on a reactionary programme. Many of the old abuses were re-established, the rights of nationalities were ignored, and bureaucratic centralization was restored. Early in 1859 events in Italy approached a crisis, and in April Austria made war inevitable by calling upon Piedmont to disarm. Aided by the French, the Italians wrested Lombardy from Austria, and though Napoleon basely deserted the Italians by the end of 1860, they made the union of Italy a foregone conclusion. In 1866 the question of the headship of Germany was decided on the field of Sadowa, and Austria was forced to cede Venetia to Italy. The Austrian empire was no longer based upon the theory of German ascendency, and it was inevitable that the relations of Austria and Hungary should be rearranged. By a famous *Ausgleich*, an Austro-Hungarian state was formed, and Francis Joseph became emperor of the dual kingdom. After Germany's triumph in 1870 Francis Joseph turned his thoughts to the Balkans as a new field for Austrian ambitions. At a private meeting with the Tsar Alexander II., he secured a promise that Austria should receive Bosnia and Herzegovina. Subsequently in 1879 and again in 1882 Austria allied herself with Germany in the Triple Alliance, and thereafter Francis Joseph accepted the secondary position in the combination, winning over Humbert I. of Italy as the third partner. During his reign numerous tragedies afflicted his house; his brother Maximilian was shot in Mexico, 1867; the Crown Prince Rudolph perished in a discreditable tragedy, 1889, and the empress was fatally stabbed at Geneva, 1898. Though a reactionary, he recognized in 1907 that the franchise agitation had popular force, and pressed upon his ministers a scheme of universal suffrage for Austria. On Dec. 2, 1908, he celebrated the sixtieth anniversary of his accession. From about this period the Archduke Francis Ferdinand came to the front and Austrian policy became assertive, notably in the annexation of Bosnia and Herzegovina. On June 28, 1914, the assassination of the archduke at Serajevo precipitated the World War. The emperor's share of responsibility can hardly yet be determined: some regard him as a prime agent; others as being scarcely conscious of the war. He died at Schönbrunn, Nov. 16, 1916, the oldest sovereign in the world, after a reign of sixty-eight years. No reign has been more disastrous to any nation.

FRANCIS, DAVID ROWLAND (1850), ex-ambassador and merchant; *b.* Richmond, Kentucky. After graduating from Washington University, St. Louis, in 1870, he entered business and in 1877 established the firm of Francis Brothers, grain merchants, in that city, of which he was mayor from 1885 to 1889. Other public offices he filled were the governorship of Missouri from 1889 to 1893 and the post of Secretary of the Interior, 1896-7, in Cleveland's second administration. President Wilson appointed him ambassador to Russia in 1916 and he was the first of the foreign envoys to recognize the new republic of Russia as then formed. He held the post till August, 1918, when the United States severed relations with the Bolshevik government.

FRANCIS, SIR PHILIP (1740-1818), Brit. politician and writer; first clerk in

War Office, 1762; member of Council of Bengal, 1773; fought duel with Warren Hastings, 1780; M.P., 1784-1807; prominent in proceedings against Warren Hastings; supposed to have written *Letters of Junius*.

FRANCIS OF ASSISI, ST., FRANCIS BERNARDONE (*c.* 1181-1226), founder of Franciscan Order; *b.* Assisi; in youth was prominent among young men of fashion; was taken captive and imprisoned in war with Perugia, 1201; his spiritual experiences during a subsequent illness resulted in complete change of life; henceforth devoted himself to religion, and became beggar, taking 'Lady Poverty' as his spouse; joined by disciples, whom he formed into new order, 1210; went as pilgrim to Holy Land, 1219-20.

FRANCIS OF PAULA, ST. (1416-1507), Franciscan friar; founded *Order of Minims* (still existing), remarkable for its specially severe rule.

FRANCIS OF SALES, ST. (1567-1622), *s.* of a Savoyard noble, studied at Jesuit College at Paris; studied law at Padua, 1588; ordained, 1592, as provost of chapter of Geneva; preached in Chablais, 1589, converting Protestants; bp. of Geneva, 1602; most devoted in his duties; in Paris, 1618-19; *d.* much revered, and was 'beatified,' 1661, and canonized, 1665; wrote several religious works.

FRANCISCANS, R.C. religious order, variously known as Grey Friars, Lesser Brethren, Friars Minor, Minorites, Seraphic Order. Divided into three bodies—First Order, including *Observantists* (the strictest, holding to the original poverty), *Conventuals* (who are allowed to hold property), and *Capuchins*; Second Order, or nuns, also known as *Poor Clares*; Third Order, or Tertiaries. Order was originally founded by St. Francis of Assisi (*q.v.*), about 1210, and was formally constituted by Pope Honorius III. in 1223. Leading idea poverty—aim being to possess only irreducible minimum necessary to maintain life.

FRANCK, CÉSAR (1822-90), Fr. composer; *b.* Liége; studied at Paris; prof. of Organ, Paris Conservatoire, 1872; church, symphonic, and chamber music.

FRANCK, HARRY ALVERSON (1881), an American author, *b.* at Munger, Mich., son of Charles Adolph and Lillie E. Wilsey Franck. He graduated from the University of Michigan in 1903 and later took post-grad. courses at Columbia, Harvard, and abroad. In addition to being a teacher of languages at various American schools, he traveled around the world during 1904-5, in Central and South America, 1911-15, the West Indies, 1919-20 and in the Orient in 1922, and was with the A.E.F. in France from 1917-19. Author: *Vagabonding Through Changing Germany*, 1919; *Roaming Through the West Indies*, 1920 and *Working North from Patagonia*, 1921, and others.

FRANCK, SEBASTIAN, FRANK, or **FRANCUS** (*c.* 1499-1543), Ger. writer; became priest, subsequently joined Reformed Church, finally becoming a freethinker; wrote *Chronica*, *Zeitbuch und Geschichtsbibel*, treating various aspects of Reformation, and other works.

FRANCKE, AUGUST HERMANN (1633-1727), Ger. pastor; *b.* Lübeck; lectured on Bible subjects at Leipzic from 1689; prof. of Gk., Halle, 1691, and later of Theology; pastor at Glaucha, 1691-1727; established free school, orphanage, and other institutions; wrote *Lectiones paroeneticoe*.

FRANCKE, KUNO (1855), a university professor, *b.* at Kiel, Germany, *s.* of August Wilhelm S. (of Danish Supreme Ct.) and Katherine Marie Jensen Francke. He was educated at Gymnasium, Kiel, and at the University of Munich. He became an instructor at Harvard in 1884 and after being asst. professor in German, also German literature, professor in History of German Culture and curator of Germanic Museum there, he was made professor emeritus and honorable curator of that institution in 1917. He was the author of several books relating to German literature and culture including *The German Spirit*, 1916 and *Die Kulturwerte der deutscher Literatur von der Reformation bis zur Aufklarung*, 1922.

FRANCKEN, JEROME (*fl. c.* 1574-1603), Flem. artist; employed by Henri III. of France; several other members of same family were distinguished artists.

FRANCO-PRUSSIAN WAR (1870-71), between Fr. Empire and Prussia. France's alarm at the growth of Hohenzollern power had been increased by disclosure of Prussia's military power in campaigns of 1866, and by formation of North Ger. Confederation. Question of cession of Luxemburg almost precipitated outbreak. Finally, a pretext was found in Hohenzollern candidature for Span. throne. Spaniards offered their throne to Prince Leopold of Hohenzollern-Sigmaringen, a distant relative of Prussian royal family. Napoleon III. resented the affair as a Bismarckian intrigue to extend Prussian power.

Benedetti, Fr. ambassador in Prussia, was sent to Ems, and in an interview with King William, July 13, 1870, demanded a plain declaration that the candidate had withdrawn his consent, and that he (the king) would never sanction the candidature at any future date. The king refused to bind himself, and summoned Bismarck by telegram explaining the incident. This telegram Bismarck manipulated, and published in such a way as to make war popular in Germany. France declared war, July 19, 1870. Confederation placed all its forces at disposal of Prussia and voted 120 million thalers for war expenses. A large army was placed in field, nominally commanded by king, but practically by von Moltke. Crown prince, Prince Frederick Charles, and Steinmetz commanded divisions.

War itself was short and sharp. Napoleon assumed command of Fr. army, aided by Marshals Bazaine, Mac Mahon, Canrobert, and Leboeuf. After action of Saarbrücken, Aug. 3, first of war, events moved rapidly. The French fought courageously, but were badly organized and outnumbered; their delay allowed Germans to enter Alsace and continue war on Fr. soil. MacMahon was defeated at Weissenburg, Aug. 4, by crown prince, and more seriously at Wörth, Aug. 6, and retreated on Châlons. General Frossard was driven from heights of Spicheren, Aug. 6, by Prince Frederick Charles and Steinmetz. Main Fr. force was now concentrated near Metz, under Bazaine. Germans won decisive victory at Gravelotte, Aug. 18. Early on 19th, Bazaine's army in Metz was invested by Frederick Charles. Rest of Ger. army, under crown prince, advanced on Paris. MacMahon attempted relief of Metz, but was caught on way and completely defeated at Sedan, Sept. 1. Next day whole army capitulated. Napoleon himself became a prisoner and was sent to Wilhelmshöhe, near Cassel.

First phase of war, exactly a month in duration, was over. News of these great disasters overthrew Fr. Empire and a republic was proclaimed, Sept. 4. Germans continued to advance. Paris was besieged by crown prince, Sept. 20. Strasbourg surrendered, Sept. 28, and on Oct. 28 Bazaine capitulated at Metz, and 150,000 Fr. troops and immense army stores were delivered into enemies' hands. Gambetta had organized three new armies beyond Loire, which carried on desperate but hopeless resistance. Germans defeated army of Loire, Oct. 9, and occupied Orléans. In provinces Germans repelled all attacks, and gradually closed in on Paris. Only place besides capital which held out was fortress of Belfort, in Alsace, surrendered Feb. 16, 1871. Paris capitulated, Jan. 28. Preliminaries of peace were arranged Feb. 26, and ratified at Frankfort, May 10.

France ceded to Germany whole of Alsace, except Belfort, and E. Lorraine, including the fortresses of Metz and Strasbourg, and agreed to pay indemnity of five milliards of francs ($1,000,000,000) within three years. On Jan. 18, 1871, King William was proclaimed Ger. Emperor at Versailles.

On the frontier at the beginning of struggle Germans had less than 400,000 men, and the French about 250,000, though these figures were doubled before the end of the contest. Ger. casualties amounted to 130,000, while French had about 150,000 killed and over 200,000 wounded or invalided and prisoners.

FRANÇOIS DE NEUFCHÂTEAU, NICOLAS LOUIS, COUNT (1750-1828), Fr. statesman and poet; *b.* Lorraine; Minister of Interior, 1797; pres. of Senate, 1804-6; wrote many works on diverse subjects.

FRANCONIA, Ger. **FRANKEN** (*c.* 49° 50′ N., 11° E.), ancient duchy of Germany; chiefly in valley of Main; afterwards one of the circles into which Germany was divided by Maximilian I., in 1501; now denotes the three N. divisions of Bavaria—Upper, Middle, and Lower F.

FRANCS-TIREURS, irregular Fr. infantry, chiefly peasants, who took part in Franco-German War, 1870-71.

FRANEKER (53° 12′ N., 5° 32′ E.), town, Friesland, Holland; from 1585-1811 seat of univ.; silk and woolen goods. Pop. 7642.

FRANGIPANI, a famous family of Roman nobility which played an important part in the quarrels of the Guelphs and Ghibellines in the 12th and 13th centuries. Giovanni F., a member of this family, who was lord of Astura, captured Conradin of Swabia in 1268, and handed him over to his enemy, Charles of Anjou. A branch of the family still flourishes in the province of Undine. The Croatian family are of Slav origin, their title being properly Frankopan, and are not descended from the Roman barons.

FRANGULA, the name given to the bark of *Rhamnus Frangula*, a species of Rhamnaceæ, commonly known as the alder buckthorn. The plant is spineless, with oval leaves, white flowers, and small, black berries, and grows to a height of over 6 ft. The berries and bark are used in dyeing, and the berries are also a strong purgative.

FRANK, GLENN (1887), an American author, *b.* at Queen City, Mo., *s.* of Gordon and Nancy Elizabeth Hombs Frank. He was educated at Kirksville, Mo. State Normal School and at Northwestern University. After being asst. to the president of the later institution from 1912-16 he was associated with Edward A. Filene, of Boston until 1919 when he became associate editor of the Century Magazine of which he was made editor-in-chief in 1921. Author: *The Politics of Industry*, 1919 and part author: *The Stakes of War*, 1918 and *The League of Nations—The Principal and the Practice*, 1919.

FRANKENBERG (50° 53′ N., 13° 1′ E.), town, Saxony, Germany: textiles. Pop. 15,000.

FRANKENTHAL (49° 32′ N., 8° 21′ E.), town, Bavarian Palatinate, Germany; ironworks. Pop. 20,000.

FRANKENWALD (50° 25′ N., 11° 30′ E.), mountainous region, Germany, connecting Fichtelgebirge with Thuringian Forest.

FRANKFORT, a city of Indiana, in Clinton co., of which it is the county seat. It is on the Chicago, Indiana and Louisville, the Lake Erie and Western, the Toledo, St. Louis and Western, and other railroads. The surrounding territory forms an important agricultural region. The town has extensive industries including the manufacture of kitchen cabinets, brick, lumber, agricultural implements, etc. There are railroad repair shops and several large wholesale grocery establishments. The public buildings include a Carnegie library, court-house, and a high school. Pop. 1920, 11,585.

FRANKFORT, a city of Kentucky, the capital of the State and the county seat of Franklin co. It is on the Chesapeake and Ohio, and the Louisville and Nashville railroads, and on the Kentucky River, 65 miles E. of Louisville. The city is well laid out upon a high plain above the river. It is industrially important and has plants for the manufacture of brooms, shoes, furniture, lumber, flour, carriages, etc. The important public buildings include the Capitol, court-house, and the governor's residence. There are several State institutions, including a State Home for Feeble Minded Children, State Colored Normal School, and the State penitentiary. There is a young men's public library, Odd Fellows Hall, King's Daughters Hospital. On a hill in the vicinity is a cemetery in which are buried the remains of Daniel Boone, several governors of the state, and other prominent persons. Pop. 1920, 9,805.

FRANKFORT-ON-MAIN, or Frankfurt, city, Hesse-Nassau, Prussia (50° 6′ N., 8° 48′ E.); wealthy and important commercially; great banking center and leading Ger. ry. jn.; terminus of Rhine river traffic; has handsome modern streets, (*e.g.*) Zeil, Kaiserstrasse; squares, and suburbs, with striking buildings and monuments. The cathedral, St. Bartholomew, was founded in 9th cent. by Lewis the German, rebuilt and extended, 1235 onwards; here, in terms of Golden Bull, 1356, of Charles IV., Ger. emperors were elected; after 1562, coronation of emperors also took place in Frankfort-on-Main. Other notable features are: Leonardskirche, begun 1219, Nikolaikirche, 13th cent., Römer, and New Rathaus, the old and modern municipal offices, historical museum, Bethmann's Museum, with Dannecker's famous *Ariadne*, Städel Art Institute and other galleries, the magnificent Schauspielhaus theatre, library, Goethe House where poet was born, 1749, Opera House, Central Railway station, Old Bridge, *c.* 13th cent., Eschenheimer Tor, 1400-28 and other mediæval gateways, palm garden and zoological garden. Seat of a univ., founded 1914. Frankfort-on-Main has long been the home of a large Jewish community, but the old house of the Rothschild family alone survives of the Judengasse. *Franconofurd* (ford of the Franks) first appears in historical records, 793; became cap. of E. Frankish Empire; many important diets and councils held here in Middle Ages; city attained autonomy under empire and became 'free imperial town'; free city of Ger. confederation, 1815-66; annexed by Prussia, 1866; Peace of Frankfort-on-Main ended Franco-German War, 1871.

The invasion of Ruhr district by Ger. troops early in April 1920 was, in the opinion of the French, another infraction of the Treaty of Versailles. On April 6 Fr. troops occupied Frankfort, 'to induce Germany to respect the treaty.' On May 17, after the number of Ger. troops in the Ruhr district had been reduced to the limit laid down by the treaty, the French evacuated the town. During the occupation Frankfort had to go bail for good behavior to the extent of one million marks, and the governor, the burgomaster, and some of the municipal councillors were held as hostages. Pop. 414,600.

FRANKFORT-ON-THE-ODER, a tn. in the prov. of Brandenburg, Prussia, on the Oder, about 50 m. S.E. of Berlin. It contains the Evangelical Marienkirche (Oberkirche), built in the 13th century; the Rathhaus, dating from 1607, and a monument to the poet Kleist, who was born in this town.

The university of F., founded in 1506, was removed to Breslau in 1811. The town is an important railway center, and has a large garrison. There are extensive coalfields in the neighborhood. Its chief industries are the manufactures of tobacco, potato-starch, earthenware, machinery, metal ware, chemicals, paper, leather, sugar, and iron and steel goods. Pop. 70,000.

FRANKINCENSE, an aromatic gum resin, is obtained by incising the bark of certain trees (*Conifers*). The fluid hardens into irregular lumps covered with white dust. It has a yellow or yellowish-brown color, a bitter aromatic taste, and a balsam-like odor. It is insoluble in water and burns with a white flame. As a drug it was widely used in all kinds of inflammatory diseases, but is little used now except for external application. It has been employed from the earliest times in incense.

FRANKLAND, SIR EDWARD (1825-99), Eng. chemist; investigated organic metallic bodies, and introduced idea of valency and bonds from observation of saturation capacity of metallic bodies. He introduced the modern form of Bunsen's gas-analysis apparatus, making it less cumbersome and slow, and with others investigated contamination of water-supplies.

FRANKLAND, PERCY FARADAY (1858), Eng. chemist, second son of Sir Edward Frankland; prof. of chem. at univ. of Birmingham, 1900; wrote *Agricultural Chemical Analysis,* 1883.

FRANKLIN, unorganized terr. of N. Canada (62°-76° 40′ N., 62° 125° E.), comprising the islands from Banks I. in the W. to Baffin Land in the E.; mainly within Arctic Circle; Indians, Eskimos, and fur-traders; formed 1895. Area, 500,000 sq. m.

FRANKLIN, a city of Massachusetts, in Norfolk co. It is on the New York, New Haven and Hartford Railroad. Included in it is the village of Unionville. The industries which are important include the manufacture of pianos, printing presses, straw hats, and cotton, woolen and felt goods. The public institutions include an almshouse and a public library. It is the seat of Dean Academy, a well known preparatory school. Pop. 1920, 6,497.

FRANKLIN, a city of New Hampshire, in Merrimac co. It is on the Boston and Maine Railroad, and at the junction of the Pemigewasset and Winnepesauke rivers, which unite to form the Merrimac. The excellent water power makes the city important industrially. It has manufactures of paper, pumps, hosiery, knitting machines, woolen goods, lumber, etc. Franklin was the birthplace and early home of Daniel Webster. There is a hospital and a public library. Pop. 1920, 6,318.

FRANKLIN, a city of Pennsylvania, in Venango co., of which it is the county seat. It is on the Pennsylvania, the Erie, the Lake Shore and Michigan Southern, and other railroads, and on the Allegheny River. It has important industries including the manufacture of flour, brick, machine shop products, and tools. The surrounding country is rich in oil. There are parks, a public library, and several handsome public buildings Pop. 1920, 9,770.

FRANKLIN COLLEGE, a non-sectarian, co-educational institution situated at Franklin, Indiana. It was established by the Baptist Church in 1834. In 1922 there were 350 students and a teaching staff of 20 under the presidency of the Rev. C. E. Goodell.

FRANKLIN INSTITUTE, a seat of technical education situated in Philadelphia. It was founded in 1824 to advance the knowledge of the mechanic arts by lectures, classes, exhibitions, meetings and by a modern scientific and technical library. Its departments embrace physics, chemistry, photography, microscopy, electricity, naval architecture, metallurgy, mechanics, engineering and technical drawing. Many industrial exhibitions have been held under the institute's auspices. Since 1834 it has had a committee who reports on inventions and awards medals and premiums for devices and discoveries of distinctive merit. The institute issues a monthly journal, founded in 1826. Special attention has been bestowed on the library, which numbers more than 100,000 volumes and pamphlets and is representative of the world's scientific literature.

FRANKLIN, or FRANKLAND, STATE OF, the name given in 1784 to East Tennessee, then in North Carolina, by the settlers on their forming a separate government for that district in resentment of North Carolina's action in ceding it to the national government. John Sevier was elected governor. A legislature was chosen, courts were established, and judges and sheriffs appointed. The settlers' action caused North Carolina to withdraw her cession of the district and to suppress the new state. In 1789 the territory was again ceded, with what is now Tennessee, to the federation of states. Tennessee was originally the Western Territory recognized as belonging to North Carolina.

Its early settlers lived under the nominal jurisdiction of that state and province. The creation of the insurrectionary state of Franklin was a protest against the unsatisfactory conditions (to the frontiersmen) of North Carolina's transfer of her Western Territory to the United States. Sevier tried to induce the state to agree to the independence of Franklin and also sought Congress's approval without success. On becoming federal territory the district came under the government of the Territory Northwest of the River Ohio until 1796, when the State of Tennessee was formed, with John Sevier as its first governor.

FRANKLIN AND MARSHALL COLLEGE, a seat of learning situated in Lancaster, Pa. The institution was established in 1853 by the consolidation of Franklin College, Lancaster, founded in 1787, and of Marshall College, Mercersburg, Pa., founded in 1836. It is under the control of the Reformed Church. Its curriculum is intended to meet the needs of higher education in the State, especially among the Germans, and to afford students an adequate preparation for technical and professional study. It has a theological seminary and an observatory. In 1922 there were 406 students and 28 teachers under the presidency of H. H. Apple.

FRANKLIN, BENJAMIN (1706-90), Amer. statesman and scientist; one of the heroes of Amer. War of Independence; *b.* Boston, Massachusetts, of poor parents. F. began life as a working printer, setting up in business for himself at age of twenty-three; almost entirely self-taught; established in Philadelphia one of earliest circulating libraries in America, 1731; served as clerk of the Gen. Assembly, 1736-51; appointed postmaster at Philadelphia, 1737, and about same time organized first police force and fire company in the colonies. In 1749, in conjunction with other citizens of Philadelphia, he formed an association for purpose of establishing an academy which was opened 1751, chartered 1753, and eventually became Univ. of Pennsylvania. He also shared in several other projects for advancement of well-being and prosperity of Philadelphia; served as a member of Gen. Assembly of Pennsylvania for thirteen years. From 1753-74 he was in joint charge of post service of the colonies. His famous experiment proving the identity of lightning and electricity was made in June 1752.

Besides achieving a great reputation as a man of science, he did much for establishment of Amer. independence. He resided in England as agent for colonies of Pennsylvania, Massachusetts, Maryland, and Georgia from 1757-62, and from 1764-75, protested against claim of Britain to tax her colonies. In March 1775 he returned to Philadelphia and became a prominent member of insurrectionary government in America. He was immediately appointed a delegate by assembly of Pennsylvania to Continental Congress in Philadelphia. In 1776 he was sent on a mission to France, and in 1778 managed to induce the Fr. government to form an alliance with the revolted colonies. But before he left Paris in July 1785 he had made commercial treaties with Sweden, 1783, and Prussia, 1785. Returning to America, he was immediately elected a member of municipal council of Philadelphia, and pres. of Supreme Executive Council of Pennsylvania, and re-elected, 1786-87. His last public act was to address a petition to Congress for abolition of slavery, Feb. 12, 1790. During his lifetime he received many literary distinctions, and published several political pamphlets and writings on economics. His many-sided genius was eminently practical, and in science and politics he was an altruist.

FRANKLIN, SIR JOHN (1786-1847), Eng. explorer; first discoverer of N.W. passage to Pacific; *b.* Spilsby, Lincolnshire; early resolved to be a sailor; served as midshipman in battle of Copenhagen, 1801; spent some time under training of Captain Flinders in exploration and mapping of Australian coasts; at Trafalgar was on board *Bellerophon*; became lieut., 1808; took part in blockade of Flushing, and distinguished himself in expedition against New Orleans, 1814. F. commanded overland expedition from Hudson Bay to Arctic Sea, 1819; became commander, 1821, and obtained post rank of captain, 1822; headed another overland expedition, 1826, and traced N. Amer. coast as far as 149° 37′ W. long.; knighted, 1829, and received other honors; was lieut-gov. of Van Diemen's Land, Tasmania, 1836-43, fostering social and political advancement of colony; *d.* June 1847 during ill-fated expedition for discovery of N.W. passage to Pacific.

FRANKLIN, WILLIAM BUEL (1823-1903), Civil War general; *b.* Hartford, Conn. He was a classmate of Ulyssus S. Grant at the U.S. Military Academy, from which he graduated in 1843. He began his army career as a member of General Zachary Taylor's staff in the Mexican war and took a heroic part in the battle of Buena Vista. As an army engineer he afterwards made surveys in the West and on the coast for lighthouse construction and taught physics at

West Point. In the Civil War he participated in the Battle of Bull Run as a brigadier-general of volunteers and in most of the battles of the Peninsula campaign. He also served under General McClellan in Maryland and under General Burnside at the battle of Fredericksburg. Dissensions over his part in the latter engagement resulted in official censure and his temporary withdrawal from war service. In 1863 he returned to the army and commanded a division in the department of the Gulf under General Banks. He was severely wounded at the battle of the Sabine Cross Roads in 1864, and was soon after captured by the Confederates, but immediately escaped. In 1866 he resigned from the army as a major-general, to engage in civil work. He became vice-president of Colt's Automatic Firearms Company and headed a commission, 1871-2 for laying out Long Island City. He represented the United States as Commissioner-General at the Paris Exposition of 1899 and was made a grand officer of the Legion of Honor.

FRANK-PLEDGE (*Frithborh*), institution possibly introduced about Norman Conquest; association of ten men in common responsibility, having a headman, *borhs-ealdor* or *frithborge-head*; sometimes confused with local tithing, a territorial subdivision, with which it became connected.

FRANKS, THE, a Germanic people who settled to the N. of the Western Goths, in the N. of France during the early part of the V. cent. A.D. Clovis, the first king of the Franks, drove the Goths out of France, 481, the country taking its name from the conquerors, just as S. Britain (England) took its name from the invading Angles. Clovis became a Christian; was baptized at Reims, 496; and was buried with his wife, Clotilda, in the Church of St. Geneviève, Paris, which she had built. This people was subsequently divided into the Austrasian and Neustrian Franks, betwixt whom there arose considerable hostility.

FRANZ JOSEF LAND (82° 5′ N., 50° 70′ E.), archipelago in Arctic Ocean, consisting of Wilczek Land (E.), Zichy Land (W.), and many ice-covered islands with flat-topped hills. Arctic animals found, and water only open in summer. Discovered and partly explored in 1873-74 by Payer and Weyprecht; explored by Jackson-Harmsworth Expedition, 1894-97.

FRASCATI (41° 48′ N., 12° 40′ E.) town, summer resort, prov. Rome, Italy; celebrated villas. Pop. 10,000.

FRASER (50° N., 122° 30′ W.), river British Columbia, Canada, formed by two branches uniting near Fort George; enters Gulf of Georgia; gold deposits; salmon-canning.

FRASERBURGH (57° 41′ N., 2° W.), seaport, Aberdeenshire, Scotland; herring fisheries. Pop. 12,000.

FRATERNAL SOCIETIES are voluntary associations formed to benefit their members without external aid or control except that exercised by State laws. They provide an insurance fund, contributed by members' dues, out of which stipulated sums are paid to the beneficiaries of deceased members, and also for sickness, disability and other purposes. They are also animated by social aims in their cultivation of the fraternal spirit. Their local branches are popular clubs, conducted on the lodge system and their meetings are usually marked by an established secret ritual.

The local lodges or chapters, which are self-governing in their own districts, elect a supreme body, which pays out the various benefits, and makes laws for the society as a whole. The formation of a society is based on the principle of representative government. Each frames its own constitution and by-laws which operate as a contract between the members individually and the society. Its management is responsible to the members for the faithful performance of their duties.

Among the leading fraternal societies of the United States and Canada are the Freemasons, Odd Fellows, Woodmen of America, Knights of Pythias, Order of Eastern Star, Good Templars, Rechabites, Loyal Order of Moose, Woodmen of the World, Red Men, Elks, Order of Eagles, Knights of Columbus, Ancient Order of Hibernians, United Workmen, Knights of the Maccabees, Order of Owls, and Royal Arcanum.

American fraternal societies are a development of the friendly societies of England, and have similar foundations and principles, but differ from them in certain features. They became first established by the institution of the Masonic Order in Pennsylvania in 1730. Later came the Odd Fellows, 1836, and the Foresters and Hibernians, 1839. The aggregate membership of the chief fraternal societies in the United States and Canada in 1922 was about 17,500,000. There are numerous smaller bodies scattered through the United States of which no statistics become available.

FRATERNITIES, COLLEGE. See College Fraternities.

FRATICELLI, name attached to certain rigorous groups of Franciscan order, who *fl.* XIII.-XV. cent's, and although condemned by John XXII. in 1318, founded ascetic colony in Sicily, exerting considerable influence there and in Italy; formed separate church, electing own popes; relentlessly persecuted in XV. cent., before end of which they finally disappeared.

FRAUD, act of imposture or deceit; defined by the jurist Pothier as 'Any kind of artifice by which one deceives another.'

FRAUDULENT PROMOTION. See Blue Sky Laws.

FRAUENBURG (54° 21′ N., 19° 40′ E.), town, E. Prussia, Germany; has cathedral, and is seat of Catholic bp. of Ermeland.

FRAUNHOFER, JOSEPH VON (1787-1826), Ger. optician; invented and improved many optical instruments, especially in regard to telescopic prisms and lenses; discovered the dark lines which are called after him, in the spectrum of the sun.

FRAZER, SIR JAMES GEORGE (1854), Brit. writer on myth. and comparative religion; chiefly known by his epoch-making work, *The Golden Bough*, which revolutionized popular ideas on myth. and the religions of savages. He has also written on totemism, early kingship, etc., and pub. in 1918 *Folklore in the Old Testament*. He has also written *Sir Roger de Coverley and Other Literary Pieces*, 1920.

FRAZIER, JAMES B. (1856), statesman and lawyer, *b.* Bledsoe County, Tenn. He studied law at the University of Tennessee, graduating in 1878, was admitted to the bar three years later, and established a practice in Chattanooga. He served as governor of Tennessee from 1903-05, and was re-elected for a second term, but resigned in 1905 to enter the U.S. Senate to fill the unexpired term of William B. Bate, 1905-11.

FREAR, WALTER FRANCIS (1863), ex-governor, *b.* at Grass Valley, Cal., son of Walter and Fannie Foster Frear. He was educated at Oahu College, Honolulu, and at Yale University. He taught Greek, mathematics and political economy at Oahu College from 1886-8 later held many judicial positions in Hawaii, including chief justice, 1900-7, was a member of the Hawaiian commission to recommend to Congress legislation concerning Hawaii and was governor of that territory from 1907 to 1913.

FRÉCHETTE, LOUIS HONORÉ (1839-1908), Fr. Canadian poet and prose writer.

FRECKLES, small brown skin spots on exposed parts of the body; specially marked in summer due to defective pigmentation.

FREDEGOND (*d.* 597), Frankish queen; an adventuress who became the wife of Chilperic I. By violent methods she removed all who stood in the way of her schemes, and eventually secured the throne for her *s.*, Clotaire II.

FREDERIC, HAROLD (1856-98), novelist and journalist, *b.* Utica, N.Y.; *d.* London, Eng. In 1876 he joined the staff of the Utica Herald and became its editor four years later. After editing the Albany Evening Journal for two years, he went to London in 1884 as correspondent of the New York Times, representing that paper till his death. Meantime he produced a number of noteworthy novels, among them *The Damnation of Theron Ware* and *In the Valley*. Much of his fiction dealt with middle-class life in New York State. In the *New Exodus*, 1892, he described what he saw in Russia as an onlooker of the anti-Semitic programs of that period. His last work, *The Market Place*, published in 1899, was based on the life of a notorious English financier. One of his novels *The Copperhead*, 1894, a story of the Civil War, was produced as a play in 1917 and met with considerable success.

FREDERICIA (55° 34′ N., 9° 45′ E.), seaport town, S.E. Jutland, Denmark, on Little Belt; formerly fortified; scene of defeat of Schleswig-Holsteiners by Danes, July 1849. Pop. 13,451.

FREDERICK, a city of Maryland, in Frederick co., of which it is the county seat. It is on the Pennsylvania, the Baltimore and Ohio, and the Frederick railroads, and on Carroll's Creek. The industries of the city include the making of coaches, leather, shoes, knit goods, palmetto, flour, etc. The public institutions include a high school, convent, State Institution for the Deaf and Blind. Frederick was twice occupied by Federal forces during the Civil War. In 1862 it was occupied by Federal troops under General McClellan. In 1864 General Early, the Confederate commander, forced its citizens to pay a ransom of $200,000. Pop. 1920, 11,066.

FREDERICK I.-III., Holy Roman emperors.

FREDERICK I. (OF HOHENSTAUFEN), BARBAROSSA (*c.* 1123-90), emperor of Holy Rom. Empire, 1152; endeavored to appease territorial feuds in Germany; settled disputed succession to Denmark; undertook first Ital. expedition, 1154; received Lombard crown at Pavia; crowned emperor, 1155, by Adrian IV.; established Duchy of Austria, 1156; *m.* Beatrice of Burgundy, 1156; forced Boleslav IV. of Poland to recognize his overlordship. Diet at Besançon, 1157, saw rupture of momentary alliance between pope and emperor. During F.'s second Italian expedition, 1158-62, Milan was destroyed. After Adrian's death, 1159, F. set up antipope; Lombard League revived; F. captured Rome, but was defeated at Legnano, 1176; F. submitted to pope 1177, and granted practical autonomy to Lombard cities, 1183; crushed Henry the Lion, 1180; secured union of Empire and Sicily by Treaty of Augsburg, 1184; drowned in Cilicia, 1190, while on Crusade.

FREDERICK II. (1194-1250), emperor of Holy Rom. Empire; *s.* of Emperor Henry VI. by Constance of Sicily. After Henry's death, 1197, Sicilian and Ger. crowns were separated; Constance and Pope Innocent III. secured F.'s succession in Naples and Sicily; elected emperor, 1212, in opposition to Otto IV.; strove to make himself despotic in Sicily; founded Naples Univ., 1224. F. made Sicily a centralized bureaucracy dependent upon himself, but left Germany to feudal anarchy; defeated revived Lombard League at Cortenuova, 1237; renewed breach with pope, 1239; Council of Lyons, 1245, deposed F., and hence war broke out; between 1245-50 F. strove to achieve ecclesiastical reform and establish a lay papacy.

FREDERICK III. (1415-93), Duke of Styria and Carinthia; elected Emperor of Holy Rom. Empire, 1440; acquired Austria, 1463; driven from Vienna, 1485, by Hungarians.

FREDERICK I.-VIII., kings of Denmark, F. I. reigned from 1523-33.

FREDERICK II. (1534-88), king of Denmark and Norway; *b.* Hadersleben; succ. to throne, 1536; *m.* Sophia of Mecklenburg, 1572; pursued policy of imperialism.

FREDERICK III. (1609-70), king of Denmark; *b.* Hadersleben; *m.* Sophia Amelia of Brunswick-Lüneburg, 1643; succ. to Dan. throne, 1648; defeated by Charles X. of Sweden, 1658.

FREDERICK VIII. (1843-1912), king of Denmark; *s.* of Christian IX.; succ. 1906.

FREDERICK I.-III., kings of Prussia; F. III. became Ger. emperor.

FREDERICK I. (1657-1713), king of Prussia; became Elector F. III. of Brandenburg, 1688; founded Halle Univ. 1694; received title of king from Emperor Leopold, 1700: *m.* Sophia Charlotte of Hanover.

FREDERICK II., THE GREAT (1712-86), king of Prussia; *s.* of Fred. Wm. I., who conceived intense dislike for him and treated him harshly; betrothed to Elizabeth of Brunswick-Bevern, 1732; served in Polish Succession War; devoted himself largely to lit., 1735-40; succ. 1740; inherited a well-administered skilfully organized despotism, a well-drilled army, and full treasury. F. developed his *f.*'s work; made Prussia a leading European power; from first showed spirit of liberalism. His two Silesian wars filled years 1740-4; Prussians invaded Silesia, 1740; F.'s aggression unjustifiable, but successful; Prussian infantry won Mollwitz, 1741; by Treaty of Berlin Austria yielded to Prussia Upper and Lower Silesia, and city and county of Glatz; in second war F. secured Silesia by Treaty of Dresden, 1745; by Convention of Westminister, 1756, F. became Britain's ally. F. overran Saxony, 1756, thus anticipating attack of his enemies, Austria and Russia, and beginning Seven Years War. F. fought tenaciously, despite great odds, and Peace of Hubertsburg, 1763, established Prussia's claim as a great power. In 1772 F. obtained Polish Prussia, except Danzig and Thorn, and part of Great Poland, which were rapidly assimilated with rest of monarchy. In Bavarian Succession War, 1777-79, F. successfully contested Hapsburg claims; formed League of Princes, 1785. An opportunist, a philosopher despot, a great administrator, cynical, selfish, industrious, tolerant, F. left his country the first of Ger. States.

FREDERICK III. (1831-88), king of Prussia and Ger. emperor; *b.* Potsdam; *m.* Princess Victoria of Great Britain, 1858; a strong Liberal; distinguished himself in war with Denmark and in wars of 1866 and 1870-71. F. acted as regent, 1878; succ. his *f.*, March 1888, but, already smitten with a mortal disease, reigned only three months.

FREDERICK III. (1272-1337), king of Sicily; became regent, 1291; crowned king on renunciation of Sicily to the Church and Angevins by James of Aragon, 1296; fought against pope and Angevins throughout reign; courageous, capable administrator.

FREDERICK I. (*d.* 1440), Elector of Brandenburg; noted military leader and administrator.

FREDERICK I.-V., Electors Palatine of the Rhine.

FREDERICK I. (1425-76), Elector Palatine of the Rhine; famed for warlike qualities.

FREDERICK II. (1482-1556), Elector Palatine of the Rhine; patron of learning.

FREDERICK III., THE PIOUS (1515-76), succ. as Elector Palatine of Rhine, 1559; *m.* Maria of Bayreuth, 1537; championed cause of Protestantism.

FREDERICK IV. (1574-1610), Elector Palatine of the Rhine; noted for his encouragement of Protestantism.

FREDERICK V. (1596-1632), Elector Palatine of Rhine; *m.* Elizabeth, *dau.* of James I. of England; elected king of Bohemia, 1619; driven from Bohemia and Palatinate, 1620.

FREDERICK I., THE WARLIKE (1369-1428), Elector and Duke of Saxony; *m.* Catherine of Brunswick, 1402; founded Leipzig Univ., 1409; secured Duchy of Saxe-Wittenberg, 1423.

FREDERICK III., THE WISE (1463-1525), Elector of Saxony; founded Univ. of Wittenberg, 1502, and was the patron and protector of Luther.

FREDERICK, THE HANDSOME, of Hapsburg (*c.* 1286-1330), Duke of Austria, 1306; defeated and captured by Louis the Bavarian at Mühldorf, 1322; claimed election as emperor of Holy Rom. Empire.

FREDERICK, AUGUSTUS I. and II. kings of Saxony.

FREDERICK, AUGUSTUS I (1750-1827), Elector, afterwards (1806) king of Saxony; enlightened ruler; took part with Prussians in Jena campaign; subsequently faithful ally of Napoleon, who made him king and Grand Duke of Warsaw.

FREDERICK, AUGUSTUS II (1797-1854), became king of Saxony, 1836; *m.* (1) Caroline of Austria, 1819; (2) Maria of Bavaria, 1833; enlightened, liberal.

FREDERICK, HENRY (1584-1647), Prince of Orange; stadtholder; famous for soldierly and statesmanlike qualities.

FREDERICK, PRINCE OF WALES (1707-51), *s.* of George II.; led opposition to government; pretentious, insincere.

FREDERICK, WILLIAM I.-IV. kings of Prussia.

FREDERICK, WILLIAM I. (1688-1740), king of Prussia; succ. 1713; gave Prussia a compact political organization, efficient civil service, well-filled treasury, and well-drilled army; assisted Russia in Polish Succession War, 1734-35; encouraged colonization.

FREDERICK, WILLIAM II. (1744 97), king of Prussia; succ. 1786.

FREDERICK, WILLIAM III. (1770-1840), king of Prussia; succ. 1797; *m.* Louise of Mecklenburg-Strelitz, 1793; defeated by Napoleon at Jena; had to surrender great part of his dominions by Treaty of Tilsit, 1807; compelled to join Napoleon in war against Russia; subsequently faithful ally of Emperor Alexander.

FREDERICK, WILLIAM, IV. (1795 1861), Prussian king; *m.* Elizabeth of Bavaria, 1823; succ. to throne, 1840; behaved irresolutely in Berlin Revolution, 1848; refused to accept leadership of Federal Diet; his refusal of imperial crown, April 1849, postponed union of Germany. F. W. established Northern Confederacy; attacked by paralysis, 1857, from which time his bro. was regent.

FREDERICK, WILLIAM, THE GREAT ELECTOR (1620-88), *b.* Berlin succ. as Elector of Brandenburg, 1640; *m.* Louise Henriette of Orange, 1646; established personal government throughout his incongruous dominions; reorganized army and finances; definitely annexed Eastern Pomerania, 1653, and was acknowledged sovereign over Prussia by Treaties of Wehlau and Oliva, 1657, 1660; won battle of Fehrbellin, 1675, over Swedes.

FREDERICKSBURG, a city of Virginia, in Spottsylvania co. It is on the Richmond, the Fredericksburg and Potomac, and other railroads, and on the south bank of the Rappahannock River, 61 miles N. of Richmond. The city is located in a valley and is surrounded by high hills. Its industries include tanneries, iron works, ice and shoe factories, woolen, flour and silk mills. There is a public library, military school, and an orphan asylum. The city and the surrounding country was the scene of one of the greatest battles of the Civil War. See FREDERICKSBURG, BATTLE OF. Pop. 1920, 5,882.

FREDERICKSBURG, BATTLE OF, fought during the Civil War at Fredericksburg, Va., December 13, 1862. The Federal Army of the Potomac of about 113,000 men was under Burnside, and the Confederate Army of Virginia of 78,000 was commanded by Robert E. Lee (*q.v.*) Burnside had succeeded McClellan on November 7, and with Lincoln's assent purposed to attack Richmond, advancing by way of Fredericksburg. He was delayed on the north bank of the Rappahannock, Nov. 16, by the non-arrival of pontoons, and Lee had time to secure strong positions on hills back of Fredericksburg. Burnside planned that his right, under Sumner should strike at Lee's left under Longstreet, his left under Franklin Lee's right under Jackson, while Hooker held the best part of the center in reserve. The Confederate left under Longstreet held Mary's Hill, and a stone wall at the base was also manned, making the position the strongest in the line. Lee's left was the weakest point, and it was there Burnside's critics said, she should have attacked. In the night of Dec. 11 Sumner and Franklin crossed the river and in the morning of the 13th, Franklin understanding Burnside's orders to mean a reconnaissance in force ordered Meade to attack Jackson. Meade gained the crest of the hill and then was driven back. The Federals, made six disastrous attacks on Mary's Hill, one led by Hancock losing 2,000 men out of 5,000. Burnside retired to the north side of the Rappahannock and attempted another advance during a rain, that ended in failure. The Federals lost about 12,000, and the Confederates 5,400. See Henderson 'The Camp of Fredericksburg,' 1886.

FREDERICTON (45° 58′ N., 66° 39′ N.), capital and port of New Brunswick, Canada, on St. John River; seat of Provincial Univ.; commercial center; large lumber trade. Pop. 8,000.

FREDONIA, a village of New York, in Chautauqua co. It is on the Dunkirk, Allegheny Valley, and Pittsburgh railroads. The surrounding country is an extensive fruit growing region and in the village are canning establishments and patent medicine factories. It is in the famous grape belt district of New York. The village is the seat of the State Normal School and has a public library. Pop. 1920, 6,051.

FREDRIKSHALD, FREDERIKSHAL (59° 8′ N., 11° 26′ E.), fortified seaport, Christiania, Norway, on Idde Fjord; near fortress Fredericksteen, at siege of which Charles XII. of Sweden was killed, 1718; timber, granite. Pop. 12,000.

FREDRIKSTAD, FREDERIKSTAD (59° 12′ N., 11° 15′ E.), seaport town, at mouth of river Glommen, Norway; timber; sawmills. Pop. 16,000.

FREE BAPTISTS, Amer. sect, founded *c.* 1779, under leadership of Benjamin Randall. See BAPTISTS.

FREE CHURCH OF ENGLAND, an Episcopal organization founded 1844, an outcome of the Oxford Tractarian movement. Its promoters sought to secure evangelical services on strictly Prot. lines, wherever needed, without alliance with the state. The first church planted was at Bridgetown, Devon, by the Rev. J. Shore.

FREE CHURCH OF SCOTLAND became a separate religious body in 1843, when by the Disruption 396 ministers and professors withdrew from the Established Church of Scotland, the number afterwards increasing to 474.

A union was effected between United Presbyterians and majority of the Free Church in 1900; thenceforward known as the United Free Church. Minority, who did not join union, retained name of Free Church.

FREEDMAN'S BUREAU, an organization established in 1865, which exercised a general supervision over freed slaves and other loyal refugees. It provided for them in all possible ways. It was abolished in 1870.

FREEHOLD system of land tenure by which the holder has the sole right of disposal, and which, if he dies intestate, descends to the heir-at-law.

FREELAND a borough of Pennsylvania, in Luzerne co. It is on the Lehigh Valley Railroad. The surrounding country is an important coal mining and agricultural region. The industries of the borough include foundries, machine shops and silk mills. It is the seat of a mining and mechanical institute, Girl's Industrial School, and Hill Observatory. Pop. 1920, 6,666.

FREEMAN one who holds special privileges in a borough or livery company; one who is not a slave.

FREEMAN, EDWARD AUGUSTUS (1823-92), Eng. historian; *b.* Harborne, Staffordshire; elected Fellow of Trinity Coll., Oxford, 1845; devoted his life to literary work; served on royal commission on ecclesiastical courts, app. 1881; regius prof. of Modern History, Oxford, 1884; spent much time abroad after 1886, owing to ill-health; *d.* of smallpox at Alicante. An indefatigable writer and great investigator, besides many other works he wrote *History of the Norman Conquest*, 1867-76; *Historical Essays*, 1872-79; *William Rufus*, 1882; *History of Sicily* (unfinished), 1891-94).

FREEMASONRY in its present form, is of English origin, and dates from the beginning of the XVIII. cent. All the stories and traditions of an ancient f. have been investigated, and prove to be without evidence to justify belief. The old claim, that f. dates from the building of the Temple at Jerusalem, and that

King Solomon was its first grand master, has been dismissed as being entirely without proof. The assemblies or lodges of masons included in the XVI. cent. members who were not operative, but speculative or theoretical, and the earlier records of masons' guilds are still extant. But f. proper, as it is known, today throughout the world, dates from the inauguration of the mother Grand Lodge on June 24, 1717, in London. On that day, four old lodges of speculative, not operative, masons set up the Grand Lodge, which was to be the governing authority over all masonic bodies. Henceforth there was no shadow of connection between operative masons and f., and no masonic lodge was admitted to be in the fraternity which did not acknowledge the authority of the Grand Lodge. A Grand Lodge was set up in Ireland in 1725, and in Edinburgh in 1736, and from these three Grand Lodges all the lodges throughout the world are derived. The first 'regular' lodge in U.S. was that at Boston, Mass., in 1733; meetings had been held at Philadelphia earlier, but without a Grand Lodge authorization. The total membership of the Masons in the United States in 1923 was about 2,600,000.

FREEPORT a city of Illinois, in Stephenson co., of which it is the county seat. It is on the Illinois Central, the Chicago and Northwestern, and other railroads, and on the Pecatonica River. Its industries include the manufacture of hardware, windmills, wagons and buggies. There are also railroad shops. There is a public library and a hospital. Pop. 1920, 19,669.

FREEPORT a village of Long Island, in Nassau co., New York. It is almost entirely a residential community although fishing is carried on to some extent. There is a high school and several club houses. Pop. 1920, 8,599.

FREE PORTS.—(1) Ports where no custom duties are charged; (2) ports with a 'zone' within which commerce is conducted without exaction of import or export duties; (3) in China, ports open to foreign trade, but not 'open' in fiscal sense. F. p's arose owing to desirability of having central markets on trade routes and refuges from pirates; greatly diminished by unification of customs and raising of tariff walls in European countries. F. p. zones exist at Hamburg and Copenhagen among other places; among colonial f. p's are Hong Kong and Singapore. As the result of treaties made following the World War, Dantzig and Fiume became free ports, under certain restrictions. See DANTZIG, FIUME.

FREE SOIL PARTY, THE, the name given to a political party in U.S., formed in 1848, which lasted till 1855, and then became one with the Republican party. It was originated by a union of the Liberal party with the Barnburners. It first nominated Van Buren for the presidency, and afterwards, in 1852, under the name of the Free Democratic party, John P. Hale became president. It was really a combination of the political abolitionists, many of whom had been formerly identified with the more Radical Liberal party, the anti-slavery Whigs, and a faction of the Democratic party in the state of New York.

FREESTONE composed of sand or grit, used in arch. for mouldings, etc., and so called because it can be easily worked.

FREE TRADE.—Name given to an economic principle, chief exponent of which is Great Britain. The term has passed through various meanings in economic history, at one time being identified with smuggling; but since the teaching of the Manchester school of economists, Cobden as chief, it has come to mean the opposite of Protection, and is generally understood to be the policy which favors the abolition of any restrictions on international trade. The economic doctrine on which Free Trade is based is a root one of exchange. In exchange one person for the time being places more value on the article he seeks after than on the article he offers in exchange. Applied to its fullest in international trade, it is supposed that the greatest amount of wealth will only accrue to everybody concerned when there is the greatest possible freedom of trade. This position, it is claimed, applies with special force to the economic position of Great Britain, chiefly dependent as she is for her corn-supply from trans-oceanic sources. Against Free Trade it is urged that the doctrines of the Manchester school have become obsolete, in view of the growth of foreign textile trades, and that only by protecting herself by tariffs against foreign competition will Brit. predominant trade supremacy be maintained. Federations like U.S., German Empire, Australia, etc., have Free Trade within the Federation, but have protective tariffs against the outside world.

FREETHINKERS, a term used of all who reject belief in divine revelation, applied especially to the deistical writers of the 17th and 18th centuries in England. The name was accepted by the rationalists as expressing persons who thought freely for themselves on all questions, including ecclesiastical and theological subjects.

FREETOWN (8° 29′ N., 13° 14′ W.), capital, Sierra Leone, Africa, on Sierra Leone R.; good harbor; Brit. coaling-station; contains governor's residence, barracks, and cathedral; exports rubber, unhealthy climate. Pop. 35,000.

FREEZING. SEE ICE.

FREGELLÆ (41° 40′ N., 13° 30′ E.), ancient town, Italy, on Liris, near Via Latina.

FREIBERG FREYBERG (50° 55′ N., 13° 20′ E.), town, Saxony, Germany, near Mulde; center of silver and lead-mining district; seat of famous mining academy; has fine old cathedral, museum, antiquities; gold and silver work; chemicals; scene of victory of Prussians over Austrians, Oct. 1762. Pop. 40,000.

FREIBURG (50° 52′ N., 16° 20′ E.), town, on Polsnitz, Silesia, Germany; watch-making. Pop. 10,000.

FREIBURG IM BREISGAU (47° 59′ N., 7° 51′ E.), chief city of Baden, Germany; beautifully situated on Dreisam, 11 miles from Rhine, on western side of Black Forest. Notable features are magnificent Gothic cathedral (XII. cent.; with paintings by Holbein and Hans Baldung, fine stained-glass windows, and tower, 386 ft.); Rathaus (XVI. cent.); famous univ. (1457). Pop. 1919, 87,946.

FREILIGRATH, FERDINAND (1810-76), Ger. poet; a voluminous writer of political verse; also translated Eng. poetry.

FREIND, JOHN (1675-1728), Eng. physician; served in the army in Spain and Flanders, and afterwards practiced medicine with much success in London; entered Parliament, but was imprisoned for a short time in the Tower for his supposed Stewart sympathies; author of works of travel and history of medicine.

FREISCHÜTZ (Freeshooter), legendary hunter who obtained from Devil magic bullets, six unerring, but the seventh guided by the Devil; opera by Weber.

FREISING (48° 25′ N., 11° 44′ E.), town, on Isar, Bavaria, Germany; XII.-cent. cathedral; with Munich gives title to R.C. abp.; breweries. Pop. 16,000.

FRÉJUS (43° 26′ N., 6° 45′ E.), town, ancient *Forum Julii*, Var, France, bp.'s see; founded by Julius Cæsar; 44 B.C. Pop. 4156.

FRELINGHUYSEN, FREDERICK (1753-1804), an American statesman and lawyer, *b.* in New Jersey. He was one of the framers of the first New Jersey Constitution, a soldier in the War of Independence, taking part in the battles of Trenton and Monmouth; a member of the Continental Congress from New Jersey, 1778-79 and 1782-83; and a senator of the United States, 1793-96.

FRELINGHUYSEN, JOSEPH SHERMAN (1869), insurance director; *b.* Raritan, N. J. He entered upon a business career after serving as a lieutenant in the Spanish-American war, and became a director of a number of insurance companies. In 1905 he was elected to the New Jersey Senate and remained a member until 1911. From 1917 to 1923 he represented that State in the U.S. Senate, but was defeated for re-election.

FRELINGHUYSEN, THEODORE (1787-1861), college president and lawyer; *b.* Millstone, N. J.; *d.* New Brunswick, N. J.; *son* of General Frederick Frelinghuysen, one of Washington's leading officers and U.S. Senator. He graduated at Princeton with high honors in 1804 after studying at preparatory schools, studied law, and practiced at Newark, N. J. From 1817 to 1829 he was attorney-general of New Jersey, resigning the post to enter the U.S. Senate, where he remained till 1835. The following year he was elected the first mayor of Newark, occupying that post for four years. He was chancellor of the University of New York for ten years (1840-50) and meantime was nominated by the Whigs (1844) as vice-president of the United States on the same ticket with Henry Clay. Rutgers College appointed him its president in 1850, and he held this position for the remainder of his career. He was closely identified with promoting the work of religious and charitable organizations, foreign missions and Sunday schools.

FREMANTLE (32° 3′ S., 115° 45′ E.), seaport, at South Swan River, W. Australia; port of call for mail steamers; iron foundries; sawmills. Pop., including suburbs, 25,000.

FREMONT a city of Nebraska, in Dodge co., of which it is the county seat. It is on the Union Pacific, the Chicago and Northwestern, and the Chicago, Burlington and Quincy railroads. The city is the center of an important dairying and livestock region. Its industries include the manufacture of flour, lumber, etc. It is the seat of the Fremont Normal School and has a public library, court-house, and a high school. Pop. 1920, 9,570.

FREMONT, a city of Ohio, in Sandusky co., of which it is the county seat. It is on the Lake Shore and Michigan Southern, the Lake Erie and Western, and other railroads, and on the Sandusky river, of which it forms the head of steam navigation. The surrounding territory is important for oil and agriculture. The manufactures of the city include the making of electro-carbons, engines, boilers, agricultural implements, stoves, beet sugar, flour, etc. Excellent water power is furnished by the river. There are parks, State Historical Building, and a public library. The city was the home of Rutherford B. Hayes. Pop. 1920, 12,468.

FREMONT, JESSIE BENTON (1824-1902), author; *b.* near Lexington, Va.; *d.* Los Angeles; *daughter* of Senator Thomas H. Benton. She married John C. Fremont, explorer, Civil war general, senator, and first Republican presidential candidate, with whom she eloped. Her writings covered a period from 1863 to 1890, and embraced narratives of the Civil War, travels, western sketches, reminiscenses and memoirs of her husband. She was included in V. T. Peacock's *Famous American Belles of the Nineteenth Century.*

FREMONT, JOHN CHARLES (1813-1890), Western pioneer and army general; *b.* Savannah, Georgia; *d.* New York. He was educated at Charleston College, where he displayed brilliant abilities as a student; but was expelled for insubordination. When twenty he taught mathematics to midshipmen in the navy, going on a cruise for two and a half years in the sloop *Natchez.* On his return he qualified as naval professor of mathematics and engineering, whereupon Charleston College honored him with the degrees of A.B. and A.M. Thereafter he became a government civil engineer, undertaking land surveys from Charleston to Cincinnati; in the Cherokee country; and in the region between the Mississippi and Missouri. He also explored the Des Moines river, the country between the Rocky Mountains and the Missouri along the Platte, and the Pacific Coast, where he reached the Sacramento Valley and the tidewater of the Columbia river. The report of his explorations in California greatly stimulated the later settlement of that region. These varied surveys occupied him from 1836 to 1845.

A second journey to California in 1846 produced a conflict with the Mexican governor, who suspected that his mission was to annex the country for the United States. Fremont withdrew to Oregon to escape hostilities, but was almost immediately ordered back to California to safeguard American interests there in face of the war with Mexico that then loomed. His presence precipitated an uprising of American residents against the Mexicans. War with Mexico having been declared, Fremont proceeded to subdue the region at the head of a body of volunteers. A clash over their respective authority between Fremont's chief, Commander Stockton, and General Kearny, who arrived on the scene to organize a civil government, led to charges by Kearny against Fremont, who was courtmartialed for disobedience and mutiny, and sentenced to dismissal. President Polk revoked the sentence and Fremont resigned from the service.

In 1850 he was elected U.S. Senator from California. Five years later he left that section to live in New York. In 1856 the new Republican party nominated him as its first candidate for the presidency, but failed to elect him. The Civil War found him in charge of the Union forces in Missouri, where he proclaimed martial law and the emancipation of the slaves belonging to rebels. This action which embarrassed the government, resulted in his being relieved of his command. He was next (1862) placed in charge of the mountain district of Virginia, Tennessee and Kentucky, but here again his military methods were questioned. His corps became merged with the Army of Virginia under General Pope, and his resignation from the army followed.

After the war he engaged in railroad building enterprises, which involved him heavily in the financial panic of 1873. Arizona selected him as its governor in 1878, and he held that office for three years. In 1890 Congress by special act made him a major-general and retired him.

FREMSTAD, OLIVE operatic singer; *b.* Stockholm, Sweden from whence she emigrated with her parents to the United States at the age of ten. They settled in Minneapolis, where she taught music. She also gave musical instruction in Duluth, Chicago and New York City. In 1892 she went to Germany and studied voice-culture under Lilli Lehmann in Berlin. Her debut as a vocalist was made in 1898 in Cologne, when she appeared in *Il Trovatore.* Afterwards she sang at Munich and Covent Garden, London. In 1903 began her long association with the Metropolitan Opera House, New York City, where she created the part of Salome in Strauss's opera of that name, being also the first to enact that role in Paris. Her repertory embraced a wide range, including the leading roles in Wagner's operas.

FRENCH, ALLEN (1870), an American author; *b.* at Boston, *son* of John James and Frances Maria Straton French. He was educated at the Massachusetts Institute of Tech., the University of Berlin and at Harvard University. He was an instructor in English at the latter institution from 1908-1913. Among his works are: *The Reform of Shaun*, 1905; *Pelham and His Friend Tim*, 1906; *The Story of Grettir the Strong*, 1908; *How To Grow Vegetables*, 1911; *The Siege of Boston*, 1911; *The Runaway*, 1914; *The Beginner's Garden Book*, 1914; *Old Concord*, 1915; *The Hiding Places*, 1917; *At Plattsburg*, 1917 and *The Golden Eagle*, 1917.

FRENCH, HARLEY ELLSWORTH (1873), an American college dean; *b.* at Delphi, Ind., *s.* of Charles A. and Mina P. Fischer French. He was educated at the State College of Washington, Northwestern University, Chicago and at the University of Chicago. After teaching for nine years in various grammar and high schools he was prof. of anatomy and physiology at the University of South Dakota School of Medicine from 1907 until 1911 and then became permanently connected with the University of North Dakota School of Medicine, as dean and professor of anatomy. He was also made secretary of the N. D. State Board of Health in 1921.

FRENCH, JOHN DENTON PINKSTONE, 1ST VISCOUNT AND EARL OF YPRES (1852), Brit. field-marshal; *b.* Ripple, Kent; first served in navy (1866-70), afterwards entering army (1874); with Nile expedition (1884-5), present at Abu Klea, Gubut, and Metammeh; commanded cavalry with Sir George White's force in Natal (1899); won battle of Elandslaagte; left Ladysmith by last train which broke through Boer cordon; appointed to command of cavalry division (Feb. 1900); relieved Kimberley (Feb. 15); forced Cronje into trap at Paardeberg (Feb. 27); bore brunt of whole Boer attack in battle of Diamond Hill (June 11-12); appointed to command in S. Transvaal (Nov. 29). On return from S. Africa given command of the 1st Army Corps at Aldershot (1901-7); inspector-general of forces (1907-11 and 1914); chief of imperial general staff (1911-14); field-marshal (1913); commander of the Expeditionary forces in France (1914-15). For history of war during 1914-15 see World War. After disastrous battle of Loos (Sept. 26) was retired in favor of Sir Douglas Haig (Dec. 15). Appointed commander-in-chief of troops stationed in England (1915-18); he was made a viscount; grant of $250,000 (Aug. 1919). Pub. *1914* (in 1919), a justification of his war record, which was severely criticized, especially in reference to incidents during the retreat from Mons, his proposal to abandon the French and land troops in Belgium, and the question of shell shortage, which involved him in a controversy with Mr. Asquith. In Jan. 1919, owing to the troubled condition of Ireland, Viscount French was appointed viceroy; an attempt was made on his life on Dec. 19, 1919.

FRENCH ACADEMY. See Academy.

FRENCH CONGO. See French Equatorial Africa.

FRENCH EQUATORIAL AFRICA or **FRENCH CONGO** Fr. terr. in W. Central Africa (3° S., 13° E.); enclosed by Gulf of Guinea, Kamerun, Sahara, Anglo-Egyptian Sudan, Belgian Congo, and Port. Kabinda; it consists of Gabum Colony, Middle Congo, Ubangi-Shari Colony (including Wadai and Kanem), and Chad terr.; coast region swampy; climate unhealthy; immense forests with valuable wood; chief rivers—Gabun estuary, Ogowe, Ubangi, Congo, Mbomu, Shari, Kuilu; principal towns—Brazzaville (Middle Congo cap.), Libreville (Gabun cap.), Bangui (Ubangi-Shari-Chad cap.), Loango (seapt.), Port Gentil (seaport); communication mainly by rivers. Principal products and exports—ivory, timber, palm oil, rubber, coffee, cocoa, vanilla, tobacco, gum, copal; gold, copper, and iron are found; whale fishing started in 1912; administered by gov.-gen. and lieut.-governors.

Gabun dist. discovered by Portuguese (1470); first Fr. settlement (1843); Libreville founded (1849); Cape Lopez ceded to France (1862); Fr. possessions gradually extended on coast and inland, especially after the explorations of Savorgnan de Brazza (1875-8, 1879-80); name Fr. Congo was changed into Fr. Equatorial Africa. Total area, 669,000 sq. m.; pop. *c.* 9,000,000. See Map Africa.

FRENCH GUIANA. See Guiana.

FRENCH GUINEA terr. W. African coast (9° N., 12° 30′ W.), between Port. Guinea and Sierra Leone, including the inland territories of Dinguiray, Siguiri, Kourassa, Kankan, Kissidugo, Beyla, Macenta, and N'zérékoré; coast flat with unhealthy climate. Konakry, cap. and principal port. Chief products and exports—india-rubber, palm oil, nuts, cattle; railway between Konakry and the Niger at Kourassa, continued to Kankan (1914) regularly visited by Fr. and Brit. steamers; formerly the old colony of the Southern Rivers (Rivières du Sud); Futa Jallon with chief town, Timbo, annexed (1891). Area, 95,000 sq. m.; pop. 1,808,900.

FRENCH INDIA (Indes Françaises), the remnant of Fr. possessions in India, consisting of five scattered *etablissements* or provinces—namely, Pondichéry, Karikal, Mahé, Yanaon, and Chandernagore; rice and ground-nuts. French India sends one deputy and one senator to Paris; governor is stationed at Pondichéry. Area, 196 sq. m.; pop. 268,500.

FRENCH INDO-CHINA, or **INDO-CHINE,** embraces the five states—Annam, Cambodia, Cochin-China, Tongking, and Laos (10° N., 106° E.); gov.-gen. resides at Hanoi. Kwang-Chau-Wan has been leased from China by France. Rice, cinnamon, sugar, tea, coal and antimony. Area, *c.* 256,000 sq. m.; pop. *c.* 17,000,000. See Map Asia.

FRENCH LANGUAGE and **LITERATURE.** See France.

FRENCH REVOLUTION, THE, was an integral part of a process begun long before. Its origin may be traced back to Louis XIV.'s policy of centralization. The nobility enjoyed privileges divorced from responsibility; the clergy also existed as a wealthy order, exempt from taxation, monopolizing all high offices. But the privileged classes had grievances in their exclusion from government, local and central; politically, they were non-existent. The king and his officials governed. People were oppressed by unjust taxation; their misery was aggravated by recurrence of famine and bad manipulation of corn trade. But economic distress was not the sole cause of revolution. The cleavage between classes was serious by the time of Louis XVI.'s accession (1774). The spirit of discontent found expression in materialistic and sceptical philosophy; Voltaire and Montesquieu gave forcible expression to the vague feelings of the people. The Encyclopédistes (Diderot, d'Alembert, etc.) popularized doctrines of scepticism and materialism, and Rousseau became the prophet of the proletariat. Fr. political economists taught similar doctrines.

A further cause of revolution was establishment of the Amer. Republic, but political reasons played a prominent part. France in 1789 was very weak internally. Fr. people had outgrown the system of government; there was a chronic national deficit, and finances were hopelessly disordered. Louis XVI. was not the man for the hour, though he attempted some reforms. Turgot became director of finances, but his reforms, including of necessity retrenchment on part of court and taxation of privileged classes, roused opposition, and he was dismissed (1776). Necker, a Genevese banker, followed Turgot's method, and had to resign (1781). A reaction followed and speedily led to revolution. The extravagance and interference in state affairs of Marie Antoinette accentuated government's difficulties, and the king embarked on Amer. War. Fr. finance became for a time irremediable. The privileged classes opposed all reform; in turn Fleury, d'Ormesson, Calonne retired, discomfited; Assembly of Notables (summoned 1787) did nothing. The king had to recall Necker, who restored partial confidence in the government.

Assembly of States-General (which had not met since 1614) met at Versailles on May 5, 1789, but, being mainly composed of amateurs, theorists, and Radical innovators, failed in reconstruction. Résultat du Conseil (Dec. 1788) had allowed Tiers Etat double representation. The question of *vote par ordre* or *vote par tete* was ended by decision of Commons to constitute themselves the National Assembly. Oath of Tennis Court (June 20), by which National Assembly swore to frame a new constitution for France, began the Revolution. The king attempted to assert himself by a Séance Royale, but found his authority defied, and, yielding to persuasion, he collected troops round Paris, dismissed Necker, and made Marshal de Broglie commander-in-chief. This drove Paris to insurrection. Riots occurred and National Guards were formed. The Bastille fell (July 14), and the king had to recall Necker and visit Paris. Although the aristocracy surrendered feudal privileges (Aug. 4), mistrust of Parisians deepened. A mob of women and National Guards marched to Versailles (Oct. 6), and, bringing royal family to Paris, practically imprisoned them in Tuileries.

Power had passed into hands of people, and many nobles emigrated. The National Assembly set to work to frame a new constitution. France was divided into departments, property of Church nationalized, 'Civil Constitution of Clergy' established, and a paper currency issued. Central authority became disorganized. Mirabeau, the greatest statesman of revolutionary crisis, tried to keep France from international complications, but he died in April 1791. Royal family fled from Paris (June 21), but was arrested at Varennes, and remained with suspended authority till Assembly resigned (Sept.). Girondist ministry declared war on Austria (April 1792). Leopold had issued Manifesto of Padua (July 6, 1791), the sequel to which was Declaration of Pilnitz (Aug. 27). Fr. attack on Belgium failed, and invasion of Tuileries (June 20, 1792) marked the final breach between king and people. Jacobins, exasperated by Brunswick's threatening manifesto and by the ill-success of the war, rebelled (Aug. 10, 1792). Power fell into the hands of Jacobins and a revolutionary commune. Massacres of royalist prisoners (Sept.) followed on Prussian advance on Paris. On day of cannonade of Valmy (Sept. 20) a National Democratic Convention superseded the Legislative Assembly. Its first act was to declare France a republic. Convention conducted the war successfully; Dumouriez defeated Austrians at Jemappes (Nov.) and occupied Belgium. The war now went hand in hand with revolutionary propaganda. Louis XVI. was guillotined at Paris (Jan. 1793), and a great coalition of European countries declared war on the French, who were driven from Belgium. Results of these reverses were the formation of the first Committee of Public Safety and the insurrection of Vendée. Revolutionary Tribunal of Paris was established (March 1793), Girondins were overthrown, and civil war raged. Republican constitution was promulgated, and (July 1793) Great Committee of Public Safety came into power.

Its rule was period of Reign of Terror. Marie Antoinette was guillotined (Oct. 1793). Robespierre's fall (July 1794) ended Reign of Terror, and the Thermidorians came into power. Insurrections of 12th Germinal (April 1, 1795), raised by Jacobins, and 1st Prairial (May 20) were followed by Constitution of the Year III. Treaties of Basel (1795) restored France to a recognized position amongst European nations. Insurrection of 13th Vendémiaire failed to dislodge an unpopular Convention, which, however, dissolved itself in Oct. The Directory and two Legislative Councils assumed power. Bonaparte became practically supreme by the *coup d'etat* of 18th Brumaire (1799), and he was proclaimed emperor (1804). Results of Revolution were recognition of equality, of liberty, maintenance of doctrine of popular sovereignty, and growth of spirit of nationality.

FRENCH WEST AFRICA (Afrique Occidentale Française), name given since 1895 to a general government uniting the Fr. possessions in N.W. Africa; includes Senegal, Mauretania Protectorate, territories of Senegambia and of the Niger, Fr. Guinea, Ivory Coast, and Dahomey, exports are fruits, oils, rubber, cotton, timber; cap. Dakar. Area, *c.* 1,500,000 sq. m.; pop. 12,206.900. See MAP AFRICA.

FRENEAU, PHILIP (1752-1832), poet mariner and editor; *b.* New York; d Freehold, N. J. He was of Hugueno descent. Graduating from Princeto in 1771, he joined the merchant marine and during the Revolutionary perio made voyages to and from the Wes Indies. In 1780 he was captured by British cruiser and made a war prisone in New York. The fruit of his imprisonment was a poem in four cantos, *Th British Prison Ship.* He wrote muc patriotic verse for the press during th revolution. When the war ended h returned to the sea as a shipmaste in the West Indies trade until 179 when he became editor of the New Yor *Daily Advertiser.* The next year Jefferson appointed him editor of the *Nationa Gazette* of Philadelphia. After som years spent in journalism, the remova of restraints on navigation made hi a master mariner again. Editions of hi poems were published in 1786, 1788 1809, 1815, 1861, 1865 and 1902-3 He was regarded as the first distinctiv American poet.

FRERE, SIR HENRY BARTLE EDWARD, 1ST BARONET (1815-84), statesman, entered the Bombay civ service in 1834, and remained in Indi for thirty-three years, during which i various posts he rendered yeoman service to the country. During the Mutin he did invaluable work in connectio with the relief of the Punjab. In 185 he was appointed a member of th viceroy's council. Returning to England, 1867, he held various offices, an in 1877 was made governor of Cap Colony and High Commissioner of S Africa. Under his rule occurred the firs Boer War and the struggle with Cetewayo. In 1880 he was recalled fo having exceeded his instructions. H defended himself in *Afghanistan an South Africa,* 1881, and other publications.

FRERE, JOHN HOOKHAM (1769 1846), an English author and diplomatist, born in London, and educate at Eton and Cambridge. He entered th Foreign Office under Lord Grenville, an from 1796-1802 was M.P. for West Looe Cornwall, during which period he contributed in collaboration with Canning to the *Anti-Jacobin* or *Weekly Examiner* 1797-98, and published *The Loves of th Triangles,* and *The Needy Knife Grinder.* In 1799 he succeeded Canning as Under-Secretary of State; in 1800 h was appointed envoy to Lisbon, being transferred to Madrid in 1802-4, and again from 1808-9. After the disaste of Corunna he retired into private life and resided chiefly at Malta, where he occupied himself with his spirited verse translations of Aristophanes.

FRESCO, painting upon plaster walls, with such colors as resist the effects of lime. True f. is worked upon fresh-laid damp plaster, upon which the figure of the cartoon is traced and colored.

FRESNEL, AUGUSTIN JEAN (1788-1827), Fr. scientist; introduced compound lenses as substitutes for mirrors in lighthouse work. He studied laws of aberration of light and polarized rays.

FRESNILLO (23° 10′ N., 102° 42′ W.), town, Zacatecas, Mexico, Central America; silver and copper mines. Pop. 7,000.

FRESNO, a city of California, in Fresno co., of which it is the county seat. It is on several important railroads and is the center of an extensive fruit growing and agricultural region. It has a public library and a hospital. Pop. 1920, 44,616.

FRET, heraldic term to denote a design formed of two crossed bars dexter and sinister with interlaced square or mascle.

FREUD, SIGMUND (1856), Austrian psychiatrist; *b.* Freiburg, Moravia. He entered the medical profession and taught physiology at the University of Vienna, where he also lectured on diseases of the nerves. He studied later at Paris under Charcot, and in 1902 became associate professor of neuropathology at Vienna. He visited the United States in 1909 and lectured before medical societies.

Freud has become a figure of international note because of his studies and writings on the subject of psychoanalysis. He seeks to unify the various processes of willing, thinking and feeling under a single casual concept. The units of action of which the mind consists are styled by Freud 'complexes' or wishes. Not all of these can be realized at one time however—some can never be realized—hence life consists of alternate expressions and repressions. The wish that is repressed is not therefore destroyed; it simply becomes subconscious and at any time may emerge with disastrous or beneficial effects upon conduct and behavior. Ultimately these complexes are reducible to the primary instincts of hunger, sex, self-preservation and the social urge.

Freud has laid special emphasis on psychoanalysis in its therapeutic aspect as a method of investigation and treatment of nervous diseases, especially those connected with sex development. His theory of dreams and his treatment of hysteria and other forms of neurosis are developed at length in his voluminous writings. His publications include *Zur Auffassung der Aphasie*, 1891; *Studien Ueber Hysterie*, 1895, translated into English 1913; *Drei Abhandlungen zur Sexualtheorie*, 1905; *Ueber Psychoanalyse*, 1910; *Totem und Tabu*, 1913; *Jenseits des Lustprinzips*, 1920; and *Massenpsychologie und Analyse des Ichs*, 1921.

FREY, FREYA (Norse myth.), goddess of love; *dau.* of Njorth and *sister* of Freyr; sometimes confused with Frigga.

FREYCINET, CHARLES LOUIS DE SAULSES DE (1828-1923), Fr. statesman; entered the senate, 1876; held ministerial rank, with short breaks, 1877-99; did much to develop the canal and railway systems of France; was four times premier; member of Fr. Academy since 1891; during the World War, on the formation of the Briand ministry in Oct. 1915, accepted office as minister without portfolio, but resigned in Dec. 1916.

FREYCINET, LOUIS CLAUDE DE (1779-1842), Fr. navigator; explored S.W. coast Australia; also neighborhood of S. Pacific.

FREYTAG, GEORG WILHELM FRIEDRICH (1788-1861), Ger. philologist.

FREYTAG, GUSTAV (1816-95), Ger. novelist and dramatist; hist. studies and modern realistic stories.

FRIAR, member of a mendicant order such as the Dominicans, Franciscans, Austin Friars, and Carmelites, as distinct from the older monastic orders.

FRIARS, BLACK. See DOMINICANS.

FRIBOURG, FREIBURG (46° 48′ N., 7° 9′ E.), canton, Switzerland; admitted into the confederation, 1481; surface hilly, traversed by river Saane; chief pursuit agriculture; prevailing religion, R.C.; language mostly Fr.; dairy-farming, watch-making, straw-plaiting. Area, 646 sq. miles. Pop. 143,000.

FRIBOURG (46° 48′ N., 7° 9′ E.), town, Switzerland, capital of canton F., on Saane; with narrow streets, numerous old houses and monasteries; founded by Duke of Zähringen, 1178, as German city; passed to Austria, 1277, to Savoy, 1452; admitted to Swiss Confederation, 1481; became independent, 1477. Pop. 1920, 20,649.

FRICK, HENRY CLAY (1848-1919), coke manufacturer, and railroad director; *b.* West Overton, Pa.; *d.* New York. Beginning business life as a clerk, he afterwards became a flour merchant and distiller, and then became a producer of coke. At first he operated ovens on a small scale. The plant developed into the H. C. Frick Coke Company, operating 12,000 ovens, and the largest coke producers in the world. In 1892 he was seriously wounded in an attempt to assassinate him in the famous strike at Homestead, Pa., because of his firm resistance to and control over the strike, and his assailant was sentenced to a long term of imprisonment. He was closely associated with the Carnegie interests, and a director of the U.S. Steel Corporation and of a number of railroad companies. By his will he bequeathed many millions for public purposes. His New York home and art gallery on Fifth Avenue, valued at $50,000,000 were left to New York City. The value of his estate shrank owing to depreciation in the market value of many securities he held. The estate yielded $9,402,000 in federal and state taxes.

FRICTION is the force called into play when the surface of one solid moves or tends to move relatively to that of another solid when both are in contact. Suppose that a brick-shaped body is placed on a rough horizontal table and that a force is applied to it horizontally so that it tends to move as a whole in a certain direction; if the force is less than a certain amount, the body will not move owing to the f. between it and the table. Friction acts in a direction opposite to that in which motion tends, and up to a certain amount is sufficient to prevent one body sliding over another; this amount is known as the *limiting f.* If now the force applied to the body be increased, motion ensues, but the f. called into play does not increase beyond the limiting f.

FRIDAY (Lat. *Dies Veneris*) derives its name from Scandinavian divinity, Frigga; a day of abstinence from flesh meat (in R.C. Church), and (according to superstition) of ill-luck; day of Crucifixion; supposed day of Adam's Creation; Mohammedan Sunday.

FRIDAY BLACK. See BLACK FRIDAY.

FRIDAY, DAVID (1876), an American economist; *b.* at Coloma, Mich., *son* of Jacob and Elizabeth Butzbach Friday. He was educated at Benton Harbor (Mich.) College and at the Univ. of Michigan. After being an instructor and later professor of economics at the latter institution for eight years he was prof. of economics at New York University from 1916-19 and then again became connected with the University of Michigan as professor of political economy. He was also statistical adviser to the U.S. Treas. in 1918 and to the U.S. Telephone and Telegraph administration in 1919 and was the author of *Problems in Accounting*, 1915; *Readings in Economics*, 1916 and *Profits, Wages and Prices*, 1920.

FRIEDEL, CHARLES (1832-99), Fr. chemist; synthesized benzene homologues, ketones, and aldehydes. He formed minerals artificially by damp and pressure, and wrote on crystallography.

FRIEDLAND.—(1) (50° 10′ N., 15° 3′ E.), walled town, Bohemia, ancient castle; textiles. Pop. 7,000. (2) (53° 40′ N., 13° 33′ E.), town, grand-duchy Mecklenburg-Strelitz, Germany; cloth manufactures. Pop. 8,000. (3) (54° 28′ N., 21° E.), town, E. Prussia, where Napoleon defeated Russians and Prussians, 1807. Pop. 4,000.

FRIENDLY ISLANDS. See TONGA ISLANDS.

FRIENDS, SOCIETY OF or QUAKERS. During the English Commonwealth George Fox bore witness to the truths in which he himself had found peace. It was a time when traditionalism prevailed in many of the Churches, and Fox, finding none to sympathize with him was led to believe in the 'inner light.' He was a great mystic, coming in a time when many were waiting for one to lead them into a spiritual faith. Wherever he preached, hearers were convinced. These were gathered after a time into societies, and were known as 'Friends.' The depth and the tenacity of their faith were proved by their endurance under persecution during the Commonwealth, and still more in the reign of Charles II.; Fox himself and Margaret Fell (afterwards his wife) were themselves heroic sufferers.

Dispensing with the outward ordinances of the Churches, they met in simple dependence upon the Spirit. They also refused to take oaths and to enter military service. In their personal lives they practiced a scrupulous speech and simplicity of dress.

The Society has not abandoned in any important way the ideal of George Fox. It has never been a large body, but its intensive influence has been great both in England and in America. During the World War the Society sent many ambulance units to France and other theatres of war. It also rehoused thousands of homeless people in France, and established maternity hospitals, etc. Upwards of $5,000,000 was expended in this work. The Friends in the United States are composed of two main bodies, The Society of Friends (93,000) and The Religious Society of

Friends (17,000). There are besides, several other bodies. The American Friends Service Committee performed valuable relief work in Europe both during and after the World War.

FRIESLAND, VRIESLAND ancient *Frisia* (53° 5′ N., 5° 50′ E.), province, Netherlands, on N.E. side Zuider Zee; surface flat, part below level of sea; coasts protected by dikes; exports horses, cattle, dairy produce; capital, Lieuwarden. Area, 1278 sq. miles. Pop. 382,891.

FRIEZE.—(1) An Irish woolen cloth, with nap on outer side; (2) in arch., central portion of the entablature of a column.

FRIGATE originally a swift Mediterranean craft, using sail and oar; name afterwards applied to swift full-rigged ships in navy carrying all guns on one deck.

FRIGATE BIRDS (*Fregata*, or *Tachypetes*), marine fowls which obtain most of their food by stealing the prey of other birds; strong, hooked beak, bifurcated wings, and slender body; *Fregatus aquila* found in northern temperate waters sometimes reaches 4 feet in length; *F. minor* inhabits the Indian and Pacific Oceans.

FRIGGA (Norse myth.), *wife* of Odin; goddess of sky; domesticity, and lower world; gave name to 'Friday'; sometimes confounded with Frey.

FRIGHTFULNESS (Ger. *Schrecklichkeit*), as practiced by the Germans during the World War, was a systematic organized terrorism directed against the civilians of invaded countries. The doctrine is as old as warfare, but with the advance of civilization was supposed to have disappeared as the settled war policy of a non-barbarous nation. It, however, remained in the treatises of German writers, who declare that it is permissible in cases of real necessity. (See Holtzendorff's *Handbuch des Volkerrecht*). Von der Goltz writes: 'Inexorable and seemingly hideous callousness is among the attributes necessary to him who would achieve great things in war.' Statements of this kind are also fully endorsed by the German General Staff's *Kriegsbrauch*, and the Kaiser and his staff openly and officially avowed 'frightfulness' as a method of breaking down the moral and crushing the spirit of adversaries. For examples of 'frightfulness' in practice, see Belgium.

FRIGIDARIUM cooling apartment in ancient Roman baths.

FRISCHES HAFF (54° 25′ N., 19° 35′ E.), lagoon, E. and W. Prussia, Germany; separated by tongue of land from Baltic, but joined by channel.

FRISIAN ISLANDS, a chain in North Sea off Dutch and Ger. coasts, between Zuider Zee and Jutland. *W. Frisian Islands* (Tessel, Vlieland, Terschelling, etc.), belonging to Holland; *E. Frisian Islands* (Borkum, Norderney, Juist, etc.), and *N. Frisian Islands* (Sylt, Heligoland, etc.), mostly Pruss.; gradually being submerged; dangerous to navigation.

FRISIANS, a Teutonic people akin to Angles and Saxons, dwelling on lowlands now covered by the Zuider Zee; joined in Anglo-Saxon invasion of Britain, and occupied district known as Mercia, between Humber and Thames. Of all Teutonic languages Frisian has always been most closely akin to English.

FRITH or **FRYTH JOHN** (*c.* 1503-33), English Prot. reformer; lived in Germany, but returned to England, 1532; arrested and burned, 1533.

FRITH, WILLIAM POWELL R.A. (1819-1909), Eng. artist; hist. and genre subjects and portraits; painter of 'The Derby Day'; wrote *Autobiography*.

FRITZLAR (51° 8′ N., 9° 17′ E.), town, on Eder, Hesse-Cassel, Germany; cathedral; first seat in Hesse of Christianity introduced by St. Boniface, 732.

FRIULI (46° 18′ N., 12° 45′ E.); district, ancient *Forum Julii*, N. Italy, formerly independent duchy, now included in modern Udine and part of Austrian districts Görz, Gradisca, and Idria.

FROBISHER, SIR MARTIN (*c.* 1535-94), Eng. admiral and explorer; conceived project of discovering a North-West passage to Cathay at early age; sailed in command of small expedition, 1576; reached Labrador; following years commanded larger expeditions under queen's patronage, but occupied himself with securing supposed gold ore, rather than attempting N.W. passage; knighted for services in Armada, 588; *d.* from wound received at Fort Crozon.

FROEBEL, FRIEDRICH WILHELM AUGUST (1782-1852), Ger. educationist. See Education.

FROGS (*Ranidoe*), tailless Amphibians, including about 450 species found the world over. There is a metamorphosis in development, through gilled and tailed tadpole stages, which resemble newts, the tail being absorbed, the breathing changing from gill breathing to lung breathing, the blood circulation from fish-like to that of the adult, the so-called mouth 'sucket' and horny jaws being replaced by a well-developed mouth, and the four limbs pushing their way into prominence. F's are aquatic, arboreal, or purely terrestrial. Amongst the first are the Edible F. (*Rana esculenta*) of Europe, the Brit. Grass F. (*R. temporaria*), and the large N. Amer. Bull F. (*R. catesbiana*), while the Flying F's of Malay (*Rhacophorus*) parachute from tree-tops with large webbed feet. From true f's the Obstetric F's (Alytes), with eggs attached to limbs of male, and the Tree F's (*Hyla*) differ in breastbone structure.

FROHMAN, CHARLES (1858-1915), American theatrical manager; *b.* at Sandusky, Ohio; *d.* at sea May 7, 1915. He entered the theatrical business in early youth and was on the business staff of Haverly's Minstrels. After an extensive experience with dramatic companies on the road he managed a stock company at the 23rd Street Theater (now Proctor's), and was the first manager of the newly built Empire Theater opened in 1893. In 1895-1896 he organized with Klaw, Erlanger and others the theatrical syndicate which became the chief factor in dramatic affairs, and almost a monopoly. He enjoyed a high reputation for liberality in management and in the payment of actors. Among the stars he managed were John Drew, E. H. Sothern and Julia Marlowe and Maud Adams. He established theatres in London and was the first to introduce regularly there American theatrical companies. He was drowned in 1915 when the Lusitania was sunk by a German submarine.

FROHSCHAMMER, JAKOB (1821-93), Ger. philosopher and theologian; *b.* at Illkofen; prof. of Philosophy, Munich, 1855; founded *Athenaum* newspaper, maintaining independence of science from religion; excommunicated, 1871. F. wrote *Uber die Freiheit der Wissenschaft*, 1861; and other works.

FROISSART, JEAN (1338-*c.* 1410), Fr. chronicler; *b.* Valenciennes; *s.* of a painter or armorial bearings; visited England, 1356; Avignon, 1360; and in 1361 returned to England to push his fortunes at court of Queen Philippa, bringing with him a book of verse chronicles, his first attempt at hist. composition. F. enjoyed queen's bounty several years, his verses and romances being much applauded. During this time he wandered freely in Scotland, Brittany, France, Italy, gathering information for his chronicles. He far excelled older generation of historians in picturesque detail and literary genius, but lacked precision and exactness; recorded brilliant tournaments, fêtes, and banquets of Edward's court, and the exploits of Eng. knights, in courtly language, viewing nations and individuals from point of view of chivalry and glorifying chivalric ideals. After death of Philippa he found a patron in French-loving Wenceslaus of Brabant, and became curé of Lestines. Subsequently he became chaplain to Gui, Count of Blois, and Canon of Chimay. That he visited Flanders is clear from lengthy account of Flemish troubles in his chronicle. He visited S. France, 1389, and was welcomed as a chronicler by Count of Foix. After his return to Valenciennes, Count Robert of Namur became his patron. He revisited England, *c.* 1406. He is said to have died in poverty at Chimay.

As a critical historian F. stands condemned, but as a painter of the life and manners of his age he is unsurpassed.

FROMENTIN, EUGÈNE (1820-76), Fr. artist and writer; excelled in N. African subjects; partly autobiographical novel, *Dominique.*

FRONDE, THE, outbreak of constitutional factiousness and personal ambition, causing civil war in France (1648-52), and having as sequel war with Spain (1653-59); hatred to Mazarin, chief factor of revolution. Paris Parlement refused to register an *octroi* duty (1648), and demanded constitutional reform. Mazarin arrested leader, but infuriated Parisians compelled court to release him and accept charter of reform. Nobility took leadership of movement from Parlement; intrigues prevailed, and civil war devastated France; but divisions arose amongst Frondeurs. Condé was defeated (1652), and joined enemies of France. Failure of F. proved that the only practical party in France was the monarchical one.

FRONTENAC, LOUIS DE BUADE, COMTE DE (1620-98), Fr. colonial administrator; entered army, becoming colonel, 1643, and field-marshal, 1646; app. gov. of Canada (Sept. 1672); recalled in 1682, owing to quarrels with Intendant and Church, but sent back to Canada and warmly welcomed by colonists, 1689; repulsed attack on Quebec, 1690; conducted campaign against Iroquois, 1695; a brave, energetic administrator, choleric, but very capable.

FRONTINUS, SEXTUS JULIUS (*c.* 40-103 A.D.), gov. of Britain (76-8); wrote on aqueducts and fortification.

FRONTO, MARCUS CORNELIUS

(II. cent. A.D.), Rom. rhetorician and grammarian; consul (143); tutor of Marcus Aurelius; disciples formed school of Frontoniani.

FROSINONE (41° 38′ N., 13° 22′ E.), town, ancient *Frusino*, Rome, Italy. Pop. 10,000.

FROST is the visible frozen vapor found on exposed surfaces. It can only occur when surface temperature falls below 32° F., the freezing-point of water. —Frostbite, gangrene, or death of a portion of the tissues of the body, due to severe cold stopping the circulation in a part, especially of the extremities, or to inflammation through sudden thawing of a frozen part. The frozen parts are thawed very gradually, or, if gangrene has already occurred, the dead portion is kept free from organisms by weak carbolic dressings, till it separates and healing takes place.

FROST, ARTHUR BURDETT (1851), artist and author; *b.* Philadelphia. In his youth he worked at wood-engraving, lithography and drawing and was an illustrator of books at the age of twenty-one. He pursued his art further at the studio of Harper and Brothers in New York, and numbered Abbey and Alexander among his associates. In 1900 he exhibited at the Paris Exposition. Humor marks much of his illustrative work and became effectively revealed in his illustrations of Stockton's novels. His books of drawings contain comic effects suggested by games and sports. His writings include *The Bull Calf and Other Tales*.

FROST, EDWIN BRANT (1866), an astronomer, *b.* at Brattleboro, Vt., *s.* of Carlton P. and Eliza A. DuBois Frost. He graduated from Dartmouth in 1886 and later studied physics and astronomy at Princeton, Strassburg Germany, and at the Royal Astrophys, Observatory, Potsdam, Germany. In 1887 he became an instructor in physics and astronomy at Dartmouth of which institution he was professor of astrophysics from 1898. He was also director of Yerkes Obs., University of Chicago from 1905, and editor of the Astrophysical Journal from 1902.

FROST, ROBERT (1875), college professor and poet; *b.* San Francisco. After studying at Dartmouth and Harvard, in 1900, he took up farming in Derry, New Hampshire, and taught English at the Pinkerton Academy there for some years, afterwards teaching psychology at the New Hampshire Normal School. Between 1912 and 1915 he was in England and later became professor of English at Amherst College. His works include *A Boy's Will*, 1913; followed by *North of Boston*; *Mountain Interval* and *A Way Out*.

FROSTBURG, a city of Maryland, in Allegheny co. It is on the Western Maryland, and the Cumberland and Pennsylvania railroads. Its elevation, 2200 feet above sea level, makes it a popular summer resort. It has industries which include the making of fire brick, tile, iron products, lumber, hosiery, etc. It is the center of an extensive coal mining region. It is the seat of the State Normal School and has a miners' hospital. Pop. 1920, 6017.

FROTHINGHAM, ARTHUR LINCOLN (1859), archaeologist; *b.* Boston, Mass. His education was European, acquired in Rome and Leipzig, and included studies in Christian archaeology and Oriental languages. From 1882 to 1886 he taught archaeology and Semitic languages at Johns Hopkins University. The following year he went to Princeton as profession of archaeology and art history, and later of ancient history. He was the founder, 1885 of the American Journal of Archaeology. His writings include works on sculpture, Vatican art, monuments of Christian Rome, sociology, architecture, and a number of brochures on Syrian archaeology. In 1919 he published Handbook of War Facts and Peace Problems.

FROTHINGHAM, OCTAVIUS BROOKS (1822-95), Unitarian pastor and author; *b.* Boston; *d.* there. He graduated from the Cambridge Divinity School in 1846 after studying at Harvard, and entered the Unitarian ministry. His advanced views on religion caused him to resign his first pastorate at Salem, Mass., which he held from 1847 to 1855. His next charge was at Jersey City, where he conducted a church that held liberal Unitarian tenets. In 1860 he established and headed the Third Congregational Unitarian Church in New York City, his radical views attracting a congregation that became estranged from established creeds and developed into the 'First Independent Liberal Church of New York.' They held services in secular halls, and selections from religious and ethical writings from all ages were read at the services. While pastor of this body he earned considerable fame as a lecturer on ethics. He resigned from his leadership in 1881, the congregation dissolving soon after, and retired to Boston, where he devoted the remainder of his years to literary pursuits.

FROUDE, JAMES ANTHONY (1818-94), Eng. historian; *b.* Dartington, Devon; ed. Westminster and Oriel Coll., Oxford; elected Fellow of Exeter Coll., 1842; came under influence of Tractarian movement of which his bro., Richard Hurrell F., was a leader; hence associated with Newman; religious opinions became shaken, and after publication of *Nemesis of Faith*, 1848, was forced to resign fellowship; thereafter contributed largely to *Westminster Review* and *Frazer's Magazine*; edit. Mrs. Carlyle's *Letters*, and wrote *Life of Carlyle*; finished *History of England* in 1870; prof. of Modern History, Oxford, 1892; hist. work characterized by brilliant style, attractive narrative, but by partiality and inaccuracy. *Life*, by Herbert Paul, 1906.

FRUIT.—When the female organs of a flower are fertilized the most important result of the process is the production of a seed; but usually the ovule from which the seed develops is not the only part of the flower to be affected: the seed vessel or ovary is frequently stimulated to fresh growth and modification, and even the part of the stalk—*receptacle*—on which are inserted the organs of the flower, may be caused to take on a new appearance or structure. The total result of all three processes is a *fruit*. This conception of the f. causes us to include under the term objects like the tomato and marrow, more generally regarded as vegetables, or like the grain of corn, usually termed a seed.

F's are classified in the first place according as they open at maturity to liberate the contained seeds or not. Those which open are variously termed *capsule*, (*e.g.*) of the foxglove; *legume*, (*e.g.*) of the pea; *silique*, (*e.g.*) of the mustard—the two latter being included in the term *pod*; the distinctions rest on the number of seed vessels in the fruit and the manner in which the latter opens. F's which do not open may be either dry or juicy. The dry f's are termed *nuts*, different types being recognized. But certain dry f's, although they do not open to liberate their seed, break up into distinct parts; such are the f's of the carrot family and of the mallow. The juicy f's are of very various structure. In the *berry* the whole of the wall of the seed vessel is fleshy, (*e.g.*) gooseberry, orange, tomato. In the *drupe* the inner layer of the f. wall is stone-like, (*e.g.*) plum, cherry. In the apple and pear the fleshy part is really the receptacle enclosing the root of the f.; while in the strawberry the fleshy part is again the swollen receptacle, this time bearing numerous small fruitlets on its surface. The fig is an example of an *aggregate f.*, developing not from a single flower but from an inflorescence. It must be mentioned that in some cases a f. is formed subsequent to fertilization but without seeds—sultana raisins, bananas; while in the fig and seedless apples no fertilization takes place.

Of great interest are the adaptations shown by the f. for securing dispersal of the seeds. F's which open frequently do so with considerable violence and scatter the seed. Examples are the whin and broom, the pods of which may be heard exploding on a warm summer day. Frequently the f. is provided with wings, by means of which it is kept floating in the air and may drift to a considerable distance—the ash, elm, and maple are good examples; while in the dandelion family the f. is provided with a tuft of hair which serves the same purpose. The burrs have hooked hairs which hang on to passing animals. Finally, we have those f's classed as fleshy which form the food of birds and other animals; the seed passes unscathed through the animal, and is deposited at a spot distant from the parent.

FRUIT - PIGEONS (*Carpophaginoe*), large sub-family of pigeons, chiefly found from India to New Zealand; damage fruit-crops.

FRUMENTIUS (*c.* 300-60), Abyssinian Christian missionary; consecrated bp., 326.

FRUNDSBERG, GEORG VON (1473-1528), Ger. soldier and imperialist leader; organized Landsknechte in Netherlands. Pavia, 1525, was largely his victory.

FRY, SIR EDWARD, G.C.B. (1827) Eng. judge; *s.* of Joseph F.; judge of High Court, Chancery Division, 1877-83; Lord Justice of Appeal, 1883-92; Ambassador Extraordinary to Hague Peace Conference, 1907; has pub. *Treatise on Contracts*, *British Mosses*, *Studies by the Way*.

FRY, ELIZABETH (1780-1845), Eng. social reformer; promoted prison reform throughout Europe, and secured great improvements in Brit. hospital system and treatment of insane.

FRYATT, CHARLES (1872-1916), master of the Great Eastern packet *Brussels*, which plied between Tilbury and the Hook of Holland. On March 28, 1916, she was ordered to stop by the Ger. submarine U 33. Fryatt, however, refused to do so, and skilfully evaded his antagonist. The Germans falsely declared that he tried to ram the U-boat. There was intense anger against him in Germany, and on the night of June 22, 1916, a flotilla of enemy destroyers captured the vessel and took her into Zeebrugge. Fryatt was imprisoned in Bruges, tried by court-martial and shot, July 27, 1916. Half an hour later a telegram was received, postponing the execution. The murder was denounced by the Brit. prime minister as 'an atrocious crime against the law of nations and the usages of war.' After the Armistice, Fryatt's body was exhumed and brought to London, where a striking memorial service was held in St. Paul's, July 8, 1919. Subsequently the body was interred at Dovercourt.

FRYE, WILLIAM PIERCE (1831-1911), American lawyer and statesman. *b.* in Lewiston, Me., *d.* there. Graduating from Bowdoin College in 1850, he studied law with William Pitt Fessenden and after practicing for some time at Rockland removed to Lewiston. He was a member of the Legislature, 1861-1862, and 1867, from his native town and in 1864 was a Presidential Elector on the Lincoln ticket. Mayor of Lewiston for one term he became Attorney General for the State on the Republican ticket, 1868-1871. In the latter year he was elected to Congress and was re-elected five times. In 1880 he resigned to become Senator on the resignation of James G. Blaine, appointed Secretary of State by President Garfield. Senator Frye was re-elected 1889, 1895, 1901, and 1907. He was President pro tem. of the Senate in 1896 and twice after the death of Vice-President Hobart in 1899, and the election of Roosevelt to the Presidency in 1901. After the Spanish War he was a member of the Peace Conference at Paris. During that war he was Chairman of the Senate Committee on Foreign Relations. He was one of the most prominent leaders of the Republican party.

FUAD I., king of Egypt (1868), succeeded his brother Hussein Kamel as Sultan of Egypt, 1917; remarkable for broad-minded ideas and progressive views. He became King of Egypt on the establishment of the independence of that country in 1922. See EGYPT.

FU-CHAU, FUCHOW, FOOCHOW (26° 7′ N., 119° 20′ E.), city, Fu-kien, China, on Min; was made free port in 1842; large transit trade with interior; exports tea, timber, textiles; contains arsenal; important mission station. Pop. *c.* 650,000.

FUCHS, LEONHARD (1501-66), Ger. physician; prof. of medicine at Ingolstadt, 1526, and afterwards at Tübingen, 1535; author of several medical works and an important illustrated work on botany.

FUCHSIA natural order *Onagraceœ*; native to Central and South Africa, was first grown in Kew Gardens in 1788. Forest plants with brightly colored pendant and funnel-shaped flowers, they are called after Leonhard Fuchs (*q.v.*). The fruit is a berry. Many forms, cultivated by selection and hybridization, exist. Most are dwarf shrubs, but some reach 12 ft. in height.

FUCHSINE or **MAGENTA** oxidation product of anilin oil; crystals with intense green metallic lustre, which dye wool and silk directly, and cotton after mordanting, a brilliant magenta.

FUCINO, LAGO DI ancient *Lacus Fucinus* (42° N., 13° 35′ E.), former lake, Aquila, Italy; drained by Prince Torlonia, 1862, and now under cultivation.

FUEL, carbonaceous matter which, when burnt, gives off heat; it may be gaseous, liquid, or solid.

Gaseous Fuel.—The most important, coal gas, gives a blue smokeless flame if mixed with air just below the point of combustion. Gas fires are made by filling an ordinary grate with asbestos and placing the gas flames at the bottom, the asbestos soon becoming red hot. Water gas, obtained by decomposing water, is sometimes used for industrial purposes.

Liquid Fuels are mainly animal, vegetable, or mineral oils. Of mineral oils petroleum, shale oil, and creosote most commonly used. Some systems use sprayed oil, others vitalize it by superheated steam. Petroleum is the most common oil used, and gives a much greater heat than coal, bulk for bulk; but apart from this, liquid fuel has many other advantages. In storing it occupies less space than coal; it is smokeless when burnt; and it abolishes stoking. The troublesome labor of coaling is dispensed with, as the liquid fuel is simply pumped into the vessel's reservoirs from barges alongside the ship. Liquid fuel also allows of a warship being equipped even though the sea is rough, a state of things which is impossible as long as coal is used. In June 1920 the White Star liner *Olympic* made her first Atlantic voyage with oil fuel; the work done by ten tons of coal was done by six tons of oil.

Solid Fuels.—Peat, compressed masses of decayed vegetable matter, is largely used by peasants, but it does not give much heat. Sometimes it is compressed and soaked in tar or oil and used in the form of bricks. Wood is little used in Britain, but in France and Germany its use is more common. Wood of compact texture—(*e.g.*) oak, beech, or elm—

burns slowly, while soft, light woods, as lime, pine, chestnut, or deal, burn quickly and give more heat. Wood charcoal is extensively used in metallurgy and in chemistry; it kindles rapidly, emits no vapors, and leaves only a few light ashes.

Coal is the most important of all fuels, and is of vegetable origin (see COAL). A variety known as lignite, or brown coal, presents a woody appearance to the eye; it is neither peat nor coal occurring in the later geological deposits. Coke is used for domestic purposes and for producing intense heat for melting metals. Anthracite coal is a smokeless variety and has 90 per cent. carbon; it is very compact and brittle.

Finely pulverized coal is now employed as a fuel, the coal dust being blown through a nozzle by air pressure and burnt. Low grade coal, with 30-40 per cent. of ash, formerly wasted is now economically used in the powdered form; this form is chiefly used in U.S. in metallurgical furnaces and for steam raising.

The latest development is 'colloidal fuel.' Powdered coal suspended in fuel oil is utilized in oil-burning installations; the addition of one per cent. of a secret 'fixateur' prevents the coal settling from the oil by gravitation. Colloidal fuel is used for naval purposes, economizing oil, and further extending the range of usable low grade coal.

Artificial Fuels, such as 'briquettes,' are manufactured from coal dust and clay, lime or coal-tar. Sometimes sawdust is used. The bricks are compressed into pieces about 6 in. square, and used for domestic purposes. This form of fuel is largely used in Europe in locomotives and for household purposes; in S. Wales over 1½ million tons of briquetted coal dust are manufactured annually for export.

FUENTERRABIA (43° 21′ N., 1° 45′ W.), town, Guipúzcoa, Spain, at mouth of Bidasso; formerly important frontier fortress; frequently besieged. Pop. 4345.

FUERO, word used in Spain in sense of right, privilege, or charter; derived from *fora*, by which established common law of occupied district was recognized by Romans. In X. cent. word *forum* emerges in sense of privilege. Earliest *fuero* extant is one granted to Leon by Alphonso V., 1020. Only *fueros* of Navarre and of the Basque survive till modern times.

FUERTES, LOUIS AGASSIZ (1874), an American artist, *b.* at Ithaca, N.Y., *s.* of Prof. Estevan Antonio and Mary Stone Perry Fuertes. Graduated from Cornell University in 1897. He began painting in 1896, specializing in bird subjects and in addition to illustrating many books including several series of the National Geog. Magazine, 1914-19, *Burgess' Bird Book for Children*, 1919 and *Burgess' Animal Book for Children*, 1920, he is permanently represented in the American Museum of Natural History, New York; also at the New York State Museum, Albany and did 25 decorative panels for F.F. Brewster of New Haven, Conn.

FUERTEVENTURA (28° 25′ N., 14° W.), one of the Canary Islands, Atlantic Ocean. Area, 665 sq. miles Pop. 12,000.

FUGGER, famous German family of merchants and bankers. Founded by John Fugger, a weaver of Graben, near Augsburg, whose son (*d.* 1408), became by marriage a citizen of Augsburg, and began a linen trade there. Business increased enormously during next generation of F's. They rendered great services to Hapsburgs; made large loans to Maximilian I., who pledged to them county of Kirchberg and lordship of Weissenhorn. Under Emperor Charles V. family reached zenith of its power and wealth.

FUGITIVE SLAVE LAWS, the laws passed by U.S. Congress between 1793 and 1850 to deal with escapes of slaves, especially with regard to their passage into non-slaving States. The owner could at first reclaim the fugitive, the decision in case of contested status of the slave being in the hands of any Federal or State magistrate. In 1824 Indiana passed a law giving right of jury trial to fugitive slaves, and this example was widely followed. The most drastic of these laws was the 1850 Compromise Measure, which led to much confusion and friction, and powerfully contributed to the outbreak of the Civil War.

FUGUE (Lat. *fuga*, flight), a musical composition of at least two voices in which 'subject' (principal melody) and 'answer' keep recurring, harmonized by laws of counterpoint. Greatest f. writers: Bach (instrumental), Handel (vocal). Prout's *Fugue*, 1891 and *Fugal Analysis*, 1892.

FUJI-SAN, FUJI YAMA (35° 21′ N., 138° 43′ E.), loftiest mountain, Japan, 12,400 ft.; dormant volcano; place of pilgrimage.

FU-KIEN or **FO-KIEN** mountainous and mar. prov. of S.E. China (23° 38′-28° 23′ N., 115° 50′-120° 28′ E.); poor sandy soil in valleys, but carefully cultivated and supplying abundant crops; watered by Min R. (M.), Lung R. (Amoy region), and head-waters of

Han R. in S.; tea and timber in decreasing quantities; bamboos, pumiloes, mangoes, and persimmons; cotton, indigo, sugar, tobacco, and camphor; lead, silver, tin, gold; molybdenum found but awaits exploitation. Chief ports Foochow and Amoy, original treaty ports; imports mainly from Hong-Kong and Shanghai. Area, 46,332 sq. m.; pop. 18,533,000.

FUKUSHIMA YASUMASA, BARON (1853), Jap. soldier and diplomat; attaché at Berlin for five years; commanded Jap. contingent during Boxer risings in China; knighted by Edward VII.; on staff of Marshal Oyama in Russo-Jap. War; cr. baron, 1906. Has written books relating his diplomatic, travel, and military experiences.

FULCRUM. See MECHANICS.

FULDA (50° 32′ N., 9° 40′ E.), town and episcopal see, on Fulda, Hesse-Nassau, Germany; has episcopal palace, several churches, seminaries; famous Benedictine abbey founded by St. Boniface, VIII. cent.; abbot in 968 made primate of all Teutonic abbeys; most ancient seat of ecclesiastical learning in Germany; seat of univ., 1734-1804; textiles. Pop. 30,000.

FULHAM, suburb, London, on Thames (51° 28′ N., 0° 12′ W.); palace and burying-ground of bishops of London. Pop. 160,500.

FULK (*d.* 900), abp. of Reims, 883; supported Charles the Simple; murdered at instigation of Baldwin, Count of Flanders.

FULK (1092-1142), *s.* of Fulk IV.; Count of Anjou, 1109-42; *m.* a dau. of Baldwin II. of Jerusalem in 1129; succ. to throne of Jerusalem, 1131.

FULLER, HENRY BLAKE (1857), author; *b.* Chicago. His publications include novels, dramatic sketches, short stories and verse. His first book was *The Chevalier of Pensieri-Vani*, issued in 1901, followed by *The Cliff Dwellers.* In 1919 he published *Betram Cope's Year*, a novel.

FULLER, MELVILLE WESTON (1833-1910), American jurist and a Chief Justice of the United States Supreme Court. *b.* in Augusta, Me; *d.* at Sorrento, Me. Graduating from Bowdoin College in 1853 he attended the lectures of the Harvard Law School (LL.D.) and was admitted to the bar in Augusta, Me., in 1855, where he began law practice, and was also associated editor of a Democratic newspaper, The Age. He was elected City Attorney in 1856, and president of the Common Council, resigning to move to Chicago in 1862 where he conducted a lucrative practice. A member of the State Constitutional Convention in 1865, he was elected to the State Legislature, 1864, and was a delegate to the Democratic National Convention in 1876 which placed Thomas Hendricks in nomination. In 1880 he was considered as a presidential candidate. For a time he retired from politics to pursue his law business. In 1888 Cleveland appointed him Chief Justice of the Supreme Court to succeed R. M. Waite, deceased. While Chief Justice he dissented from the majority of the court in 31 cases. In 1899 he was a member of the Arbitration Conference at Paris to adjust the Venezuela Boundary tangle, and in 1904-5 Great Britain selected him as arbitrator at the Hague in the case of the French flag at Muscat. See Reader, *The University of Pennsylvania Law Review*, Oct. 1910, for a review of his work in the Supreme Court.

FULLER, MYRON LESLIE (1873), an American geologist, *b.* at Brockton, Mass., *s.* of Albert Henry and Phoebe Ann Fuller. He was educated at the Mass. Inst. Tech. From 1895-1902 he did private field work and field work for both the Michigan and the U.S. Geological Survey, and in 1903 organized the Eastern section of the division of hydrology of the latter and was in charge of same until 1906. The following year was in charge of the coastal plain investigations, U.S. Geol. Survey, after which he worked independently. He made extensive explorations in China, Manchuria and Mongolia and did a great deal of field work in coal, oil and gas fields and on glacial and artesian water problems.

FULLER, SARAH MARGARET Marchioness Ossoli (1810-50), American writer and critic, *b.* in Cambridgeport, Mass. *d.* off Fire Island beach. She was the eldest of eight children and was at first educated at home by her father and then under Dr. Park and Miss Prescott's School at Groton. She began Latin at the age of six, and Greek at thirteen, and injured her health by overstudy. On her father's death in 1835 she maintained her brothers and sisters by school teaching. She held 'conversations' in Boston, and was the first editor of the Dial, organ of the New England transcendentalists, 1840-42. Her first book *A Summer on the Lakes* appeared in 1844, and the same year she was called to New York to be literary editor of the N.Y. Tribune. In 1846 she went to Europe, living mostly in Rome where in December, 1847 she married Giovanni Angelo, Marquis of Ossoli.

They had one child. She worked in the hospitals during the Italian struggle, when Rome was besieged by the French, and when the city fell in 1849, retired to the mountains of the Abruzzii. On May 15, 1850 she sailed for America and with husband and child was drowned off Fire Island beach, July 16. Her most important works are *Woman of the 19th Century*, 1844; *Papers on Literature and Art*, 1846. She translated Eckermann's *Conversations with Goethe*, 1839. Her *Love Letters*, 1845-46, appeared in 1903. See Braun *Margaret Fuller and Goethe*, 1910, and Mrs. Dall *Margaret Fuller and her Friends*.

FULLER, THOMAS (1608-61), Eng. cleric, wit, and historian; became rector of Broadwinsor, Dorset, 1634; pub. *History of the Holy War*, 1639; attained fame in London by lectures at the Savoy; during Civil War supported king, acting as chaplain to Sir Ralph Hopton's regiment; afterwards lived at Exeter, and in 1646 compounded with government for his presence among king's troops; perpetual curate of Waltham Abbey, 1648; app. royal chaplain at Restoration. F. wrote *Good Thoughts in Bad Times*, *Pisgah-Sight of Palestine*, *Worthies of England*, *Church History of Britain*. His style is full of wit and humor.

FULLER'S EARTH, a greenish unctuous powder, usually consisting of hydrous aluminous silicate with some magnesia, iron oxide, and soda. S.G. 1.7-2.4; employed in filtering mineral and decolorizing vegetable oils, and in dry cleaning as an absorbent of grease.

FULLERTON, LADY GEORGINA (1812-85), Eng. novelist and philanthropist.

FULMAR. See SHEARWATER FAMILY.

FULMINIC ACID (HCNO) has same structure as cyanic and cyanuric acids; very explosive, with poisonous vapor. Its salts, especially fulminating mercury, are extremely explosive, and are used with potassium nitrate for filling percussion caps. Fulminates, explosive compounds such as mercury fulminate derived from f.a.; used in detonators.

FULTON, a city of Missouri, in Callaway co., of which it is the county seat. It is on the Chicago and Alton Railroad. The surrounding country forms an important agricultural and stock raising area and there are also extensive deposits of coal and fire clay. The industries include the manufacture of flour, fire brick, and overalls. Fulton is the seat of the State School for the Deaf, the State Hospital, and Insane Asylum. Here are Westminster College, a conservatory of music, and William Woods College. Pop. 1920, 5,595.

FULTON, a city of New York, in Oswego co. It is on the New York Central, the Lackawanna, and the New York, Ontario and Western railroads, and on the Oswego Canal and Oswego River. Its industries are important and include the manufacture of chocolate, flour, woolen goods, paper, motor boats, etc. It has a public library and other public buildings. Pop. 1920, 13,043.

FULTON, ROBERT (1765-1815), American engineer and inventor, *b.* at Little Britain, Pa. of Irish parents in humble circumstances, his education was confined to learning how to read and write, but he studied at home. Apprenticed to a Philadelphia jeweler he also took to painting miniature portraits and landscapes and sold enough to buy a small farm for his widowed mother. At 22 he went to London and studied under Benjamin West, finally giving up art for mechanics, having won the interest of the Duke of Bridgewater and Earl Stanhope. Taking up the study of canals in 1794 the government gave him a patent for an inclined plane that was to take the place of canal locks. In 1796 he went to Paris and remained seven years. He invented the 'Nautilus' a submarine, that carried torpedoes for warfare, and then studied steam navigation. In 1803 a small boat propelled with steam was tried with success on the Seine. In this venture and others he was helped by the United States Minister, Robert Livingston. He went to New York in 1803, and in 1807 the steam boat 'Clermont' was launched and made a successful trip to Albany at a speed of 5 miles an hour. Fulton and Livingston were granted a monopoly for steamboats by the legislature, and the boats became numerous in various rivers of the country. Fulton was not the first in steam navigation, but the first to make it a success. Already Rumsey and Fitch in America in 1786-87 had tried it, and many attempts had been made to harness steam for boats in Europe. Fulton in 1814 planned a steam warship with 44 guns, but the war of 1812 stopped experiments, and it was used for a receiving ship. He worked on the 'Nautilus' submarine until his death. In 1909 the centenary of the 'Clermont' and Tercentenary of the discovery of the Hudson, was celebrated on that historic river. See Knox *Fulton and Steam Navigation*, and Sutcliffe, *Robert Fulton and the Clermont*, 1910.

FUMARIACEÆ, genus of herbaceous

dicotyledons, the commonest of which is *Fumaria officinalis*, which produces potash and is used in dyeing.

FUMARIC AND MALEIC ACIDS (COOH.CH:CH.COOH), unsaturated compounds of identical structure, with dissimilar actions explained by the relative positions of the atoms in space.

FUMIGATION, in med., purification by the burning or heating to the point of volatilization of drugs—such as sulphur—which, when burned, are antiseptic; mercury is also used (see ANTISEPTICS and DISINFECTANTS.) The term is also applied to the process employed by gardeners for destroying certain insects which threaten the plants of a conservatory, open garden, or greenhouse. Tobacco is the substance commonly employed.

FUNCHAL (32° 37′ N., 16° 54′ W.), seaport town, capital of Madeira Islands, on S. coast Madeira; bp.'s see; residence of governor; commercial center; port of call for steamers. Pop. 20,844.

FUNCTION, in physiology, the special activity of a cell, tissue, or organ. In organisms which comprise but a single cell, all the various types of activity necessary for the maintenance of the living state are undertaken by the cell as a whole; the amœba, for example, performs the processes of engulfing its food, digesting it, excreting waste material and building up the nutrient matter into its own substance by chemical and physical actions in which all parts of the cell seem to join. Multicellular organisms, on the other hand, possess cells which are differentiated for special activities, and their form is determined by the work they are called upon to do. Again, certain cells take on a measure of continuity with each other to form tissues, which are again differentiated according to the work they have to perform. Thus we have connective tissues, including the varieties: osseous tissue, cartilaginous tissue, fibrous tissue, adipose tissue, etc., nervous tissue, epithelial tissue, etc. These tissues enter into the structure of organs with special activities; thus we say the F. of the stomach is to digest, that of the kidney to excrete waste liquid products, and so on.

FUNCTION.—Whenever two quantities are so related that any change made in one produces a corresponding change in the other, then the latter is said to be a *function* of the former. This relation is usually represented by the letters F, f, o, u, etc. Thus y—F(x), $u=f(x)$, $v=o(x)$, denote that y, u, v are functions of x, and their values are determined for any particular value of x when the form of the function in question is given. x is in this case the *independent variable*; y, u, v are *dependent variables*. By taking corresponding values of (say) x and y for co-ordinates, curves may be obtained representing graphically the function concerned.

FUNDS, PUBLIC. See DEBTS, NATIONAL; FINANCES; FINANCIAL SYSTEM, UNITED STATES.

FUNDY, BAY OF (45° N., 66° W.), inlet, N. Atlantic Ocean, separating Nova Scotia from New Brunswick; remarkable for high tides.

FÜNEN, FYEN (55° 20′ N., 10° 20′ E.), Danish island in Baltic Sea, between Zealand and Jutland. Area, 1100 sq. miles. Pop. 280,000.

FÜNFKIRCHEN, PECS (46° 6′ N., 18° 13′ E.), town, Baránya, Hungary; capital of privince; leather, cloth, and earthenware. Pop. 45,000.

FUNG-HWANG, FENG-HWANG, king of Phœnix of Chin. myth., and one of the supposed guardians of China.

FUNGI are flowerless plants devoid of chlorophyll, and therefore of necessity leading either a parasitic or a saprophytic (living upon dead plants) mode of life. They are usually divided into four main groups, the Schizomycetes or 'Fission F.,' the Myxomycetes or 'Slime F.,' the Phycomycetes or 'Alga-like F.,' and the Eumycetes or higher f., each of which is in turn again subdivided. The *Schizomycetes* include the various bacilli and bacteria, and play an important part in determining the balance of terrestrial life. They are minute unicellular or filamentous forms, often rodlike, and in many cases possess one or more cilia. Many are the cause of disease, as in cholera and phthysis, whilst others give rise to fermentation (*e.g.*, the vinegar and lactic acid bacilli, and to the putrefaction and decay of anima and vegetable substances. They occu throughout the atmosphere and i water, and are usually only killed by rigid sterilization. They multiply rapidly by binary fission under favorabl conditions and by hard-walled resting spores in adverse circumstances.

FUNGUS-GNATS or **MIDGE** (*Mycetophilidoe*), minute flies, the larva of which burrow in fungi or in decayin vegetation.

FUNK, ISAAC KAUFFMAN (1839 1912), publisher; *b.* Clifton, Ohio. H studied theology after graduating fro Wittenberg College in 1860, and fou years later became pastor of a Luthera Church in Brooklyn, N.Y. Resignin from the ministry, he traveled extensively and returned to establish a publishing business, 1877, in partnership with A. W. Wagnalls, forming the firm of Funk & Wagnalls. He founded the *Metropolitan Pulpit* (now the Homiletic Review) in 1876; the *Voice*, a prohibition journal, in 1880; the *Missionary Review* in 1888; and the *Literary Digest* in 1889. He was editor-in-chief of the *Standard Dictionary* from 1890 to 1894, and in 1901 established the *Jewish Encyclopedia*. He was deeply interested in evolution and psychic research and was the author of books on these subjects.

FUNSTON, FREDERICK (1865-1917), American soldier. *b.* at New Carlisle, O; *d.* at San Antonio, Texas. He was educated at the State University, Kansas and was later appointed Commissioner by the Department of Agriculture to explore Alaska, 1893-94. Throwing in his lot with the Cuban insurgents, 1896-97, he was appointed captain and promoted Lieutenant-Colonel for bravery in action. Suffering from wounds and ill-health he was returning to the United States when captured by the Spaniards, who at first condemned him to death, but at last freed him. In the Spanish War he was colonel of the 20th Kansas Volunteers; brigadier-general of volunteers in the Philippines in 1899 and in 1901 he led an expedition that captured the Filipino chief Aguinaldo, and was promoted to be brigadier-general of the U.S. regular army. In 1905 he was appointed to command the Department of California. During the earthquake, 1906, he established martial law and brought order out of confusion. In 1907-08 he commanded the troops at Goldfield Mining district during the strike. In May 1914 he was at Vera Cruz, Mexico, and in March 1916 was appointed commander-in-chief of the American army on the Mexican border, and directed the effort to secure the bandit Francisco Villa in Mexico. See his *Memories of Two Wars*, 1911.

FUR, the term applied to the densely set, soft, and fine hairy coat of a mammal, used for purposes of dress and for felting in the manufacture of hats. For latter purpose fur of beaver formerly used; rabbit fur or 'nutria' (from a small S. Amer. animal, the coypu) chiefly employed for felting (see HAT). Skins are *dressed* by chemical means (cleansing, washing, and mechanical stretching), and many are dyed. The most important furs are derived from small animals, of the weasel tribe—(*e.g.*) ermine, mink, sable, and marten. The more expensive furs are imitated in cheaper skins.

FUR TRADE is of prehistoric antiquity in Asia; first appeared in Europe about 6th cent., and owing to rarity, such skins as ermine were restricted to royalty, nobles, and religious orders. Geographical discoveries of 15th cent. brought supplies from Russia and Far East, and opening of America to trappers and traders gradually made use general. At first the whole of N. America was a fur region, and rivalries between traders often led to open war, especially in the N., when the Eng. monopoly of the Hudson's Bay Co. was challenged by Fr. traders of the St. Lawrence; largely due to fur trade that the American continent was so early explored. Enormous amount of furs sent to Europe from Canada in 17th and 18th centuries, especially seal, beaver, otter, and bison. The great fur markets of the world are London, Leipzig, and New York, which has the greatest trade of all. The most important of fur skins is seal, which is now protected, and in consequence the herds have increased. Rookeries on Pribilov islands are highly productive. The growing scarcity of fur-bearing animals has led to fur farming, extensively practiced on several of the Alaskan islands, Prince Edward's Island, and elsewhere in Canada and the United States. There are many skunk farms in the United States, where also the caracul is being fostered. Its original home is Central Asia, and in the past the chief fur market was the summer fair of Nijni-Novgorod.

FURFOOZ (50° 13′ N., 4° 58′ E.), village, Belgium; notable for discovery of caves containing remains of prehistoric man, 1872.

FURFURANE or **FURANE** (C_4-H_4-O), colorless liquid, B.P. 32°, with characteristic smell, found in distillation products of pine-wood. It does not react with sodium or phenylhydrazin, but forms dye-stuffs with isatin and phenanthenequinone.

FURIES. See EUMENIDES.

FURKA PASS, one of the highest Alpine passes in Switzerland (7992 ft.). It leads from Andermatt, in the canton of Uri, to the Rhone Glacier, passing through the Reuss Valley and ending at the Hotel Gletsch in Valais.

FURLONG, a measure of length amounting to one-eighth of a statute mile. The oriental term was 'furrow-long,' and was the measurement of a furrow in the 'common-field' system, and in consequence varied according to the districts, but the side of a square containing 10 acres was the generally accepted length, 40 poles. In the 9th century the word F. was used to translate the Latin *stadium*, which was one-eighth of a Roman mile.

FURLOUGH, a military term used for leave of absence. On home service it applies to non-commissioned officers and men, but on foreign service it is also applied to officers. When on F. a soldier may not leave his country, and is in receipt of full pay.

FURMAN UNIVERSITY a Baptist coeducational seat of learning situated at Greenville, S.C. It was established in 1851 as an outgrowth of an earlier institution, the Furman Academy and Theological Seminary, formed in 1827. There are preparatory and collegiate departments. In 1922 it had a student roll of 375, and a teaching staff of 24 under the presidency of W. J. McGlothlin.

FURNACES are devices for the useful application of heat, produced, as a rule, by the combustion of fuel, but of late years also by electrical energy. Object aimed at in all forms of furnace is to bring fuel and air together in such proportions that combustion may be as complete and regular as possible, while the heat is utilized in the manner required and to the full. In furnaces for heating boilers, fuel is spread on a grate of fire-bars with small spaces between. Supply of air is more easily regulated than that of fuel. Hand-firing is the most common method, but 'mechanical stokers' are frequently employed. Air is usually provided by draught of a tall chimney, but in steamships and locomotives it is forced through the furnace by fans, or drawn through by the injector action of a jet of exhaust steam placed in the exit of the furnace gases or by exhauster fans. In the case of furnaces where high temperatures are required, jets of air under pressure are forced over the glowing coals by fans, bellows, or Blowing Machines. This is the case in the cupola furnace for iron founding and in blast furnace for reduction of ore (see IRON). *Reverberatory furnaces* are used where the substance being heated must be kept from contact with the solid fuel or its ashes; many kinds according to purpose to which they are to be put.

Gas Furnaces.—Gas firing with a cheap gas has a very extended application on a large scale. By using the waste heat of the furnace on Siemens' regenerative principle to heat up the gas and air to be burnt, a higher temp. can be obtained with great economy of fuel. Producer gas (carbon monoxide mixed with about 65 per cent. nitrogen and obtained by drawing air through red-hot coal) is chiefly employed. In the newest types of this kind of furnace the regenerators (R) are placed at the side and not under the hearth.

Open-hearth Furnaces are now constructed with capacities up to 250 tons of molten metal, and are worked on the 'continuous' system, part of the charge being run off at a time, more steel, iron, etc., being then added and the process repeated; to facilitate pouring, the furnace is made to roll or tilt. The Talbot furnace is of this type, its rolling portion weighing some 1,000 tons.

Electric Furnaces are used for the highest temperature. Two classes: (*a*) those in which heating is obtained by electric arcs, and (*b*) those in which it is obtained by the resistance offered to the current. For smelting the 'indirect' induction furnace is sometimes used. Electric furnaces differ in construction according to whether the product to be obtained is a gas, a liquid, or a solid. Carbide furnaces are of the arc type, as also are those for producing carborundum or graphite by the Acheson process. Electric furnaces are now being adopted in steel works to supersede the crucible process. The increase of output thus obtained is phenomenal. The U.S. Steel Corporation is now erecting a single plant capable of producing over 200,000 tons per annum. About 90 per cent of electric steel furnaces are of the arc type, the remainder using induction heating.

Melting Furnaces.—Special furnaces are used to melt gold, silver, bronze, and alloys of copper, nickel, etc., for casting into ingots or bars. Recently gas-fired furnaces have been employed for this purpose with conspicuous success. Those at the Royal Mint are fired with coal gas after it has been mixed with the right proportion of air to give perfect combustion (see BUNSEN). For very quick melting and very high temperatures the gas is sometimes used under high pressure and at high velocity. Fuel is economized by preheating the air. The oil furnace, which is a useful alternative to the gas furnace where gas is expensive or not available, has a special burner to which the air is supplied at a pressure sufficient to atomize the oil. With air at 25 lb. per sq. in., about 1 lb. of oil is used to melt 7 lb. of metal. See HEATING SYSTEMS.

FURNACE, BLAST. See BLAST FURNACE.

FURNEAUX, TOBIAS (1735-81), Eng. navigator; commanded *Adventure* in Cook's 2nd voyage; charted Tasmania. F. Islands, between Tasmania and Victoria, Australia, are named after him.

FURNES (51° 4′ N., 2° 38′ E.), town, W. Flanders, Belgium; tanneries and linen works. It was the scene of severe fighting during the World War. Pop. 6200.

FURNESS (54° 15′ N., 3° 6′ W.), district, N.W. Lancashire, England, forming peninsula between Morecambe Bay and Irish Sea; rich in hematite iron-ore; chief town, Barrow-in-Furness; near Dalton are ruins of Furness Abbey, founded 1127.

FURNESS, SIR CHRISTOPHER (1ST BARON FURNESS OF GRANTLEY) (1852-1912), shipowner and shipbuilder. With Edward Withy founded Furness line of steamers, and in 1885 the firm of Furness, Withy, and Co., shipbuilders, of which he became head. Raised to peerage (1910).

FURNESS, HORACE HOWARD (1833-1912), Shakespearian scholar and editor; *b.* Philadelphia, Pa.; *s.* of William Henry Furness, a Unitarian pastor of note. After graduating from Harvard in 1854, he traveled abroad for two years, then studied law and was admitted to the Philadelphia bar in 1859. His early studies of Shakespeare culminated in his exhaustive work, the *New Variorum Edition of Shakespeare*, the first volume of which, published in 1871, contained *Romeo and Juliet*. Successive volumes of the dramatist's works, with an analytic examination of the text, appeared periodically till 1913. He also edited the letters that passed between Emerson and his father, published (1910) in *Records of a Lifelong Friendship*. In his Shakespearian studies he was assisted by his wife, who prepared *A Concordance to Shakespeare's Poems*. Gottingen University gave him the honorary degree of Ph.D. as a tribute to his work, and like honors were conferred upon him by Harvard, Yale and Columbia Universities.

FURNESS, HORACE HOWARD (1865), an American editor and scholar, *s.* of Horace Howard Furness; *b.* in Philadelphia. He graduated from Harvard in 1888 and took postgraduate courses at the University of Pennsylvania. For several years he was instructor of physics in the Episcopal Academy, Philadelphia, and after 1901 collaborated wth his father on the *Variorum Shakespeare*, and after the latter's death continued this great work. He was a member of many learned societies and institutions.

FURNESS, WILLIAM HENRY (1866-1920), ethnologist; *b.* Wallingford, Pa.; *s.* of Horace Howard Furness (*q.v.*). He graduated in medicine from the University of Pennsylvania in 1891 after studying at Harvard. Folklore and the psychology of the anthropoid apes became his special fields of study, and he traveled widely on scientific tours, especially in South America. His travels in Borneo produced works by him on its folklore and the home life of its head hunters.

FURNISS, HARRY (1854), Brit. caricaturist and book illustrator; on staff of *Punch* (1884-94).

FURNITURE, general name for tables, chairs, cabinets, beds, and other domestic objects of a like kind. Examples of Egyptian f., dating back to about eighteen cent's B.C., are still in existence. The ancient used very little f.—beds and couches, chiefly, and few chairs. Yet f. they did use was often very ornate. The Egyptians used wooden f., carved in fantastic animal shapes, and gilded. Other nations used cedar and ebony, and their f. was often inlaid with ivory and precious metals. Greek f. was simple; Roman ornate, but both nations used little. Eng. f., until after the Conquest, was of the rudest description, but a rapid change took place with the advent of the Normans. Yet throughout the feudal period such f., as was used was substantial rather than ornamental. Massiveness, too, was characteristic of most of the f. produced from the time of the Early Tudors to that of Queen Anne. The golden age of f.-making in Europe was the XVIII. cent., and in England work of the most elaborate and beautiful description was produced by such artists as Chippendale, Sheraton, Heppelwhite, Adams, and others. The Victorian period in f. was generally one of heaviness and ugliness; but since then there has been a marked revival of more tasteful designs and lightness of form.

FURNIVALL, FREDERICK JAMES (1825-1910), Eng. scholar and philologist; founded the Early Eng. Text, Chaucer, Browning, and numerous other Societies.

FURS, SEAL. See SEALS.

FURSE, CHARLES WELLINGTON (1868-1904), Eng. artist; achieved eminence by his portraits and outdoor studies.

FÜRSTENBERG.—(1) Noble house in Swabia, dating back to XII. cent. family played important part in Ger. political, military, and ecclesiastical history; Franz Egon (1625-82) and *bro.* Wilhelm Egon (1629-1704), both Counts of F. and Bp's of Strassburg, served Louis XIV.'s interests. (2) Family in Westphalian Rhine district, dating from

XIII. cent. to which belonged Franz Friedrich Wilhelm (1728-1810), who promoted agriculture and education.

FURSTENWALDE (52° 23′ N., 14° 2′ E.), town, on Spree, Brandenburg, Prussia; machinery. Pop. 25,000.

FÜRTH (49° 29′ N., 10° 59′ E.), manufacturing town, Bavaria, Germany; population mainly Jews; mirrors, toys. Pop. 70,000.

FURZE, GORSE or **WHIN** (*Ulex europoeus*), a xerophytic shrub which grows abundantly on heaths and similar places; characterized by needle-shaped leaves and modification of branches to form spines.

FUSAN (35° 24′ N., 129° 26′ E.), port, Korea Bay, Korea; opened to foreigners, 1876; exports silk, rice, vegetables, and hides; terminus of Seoul-Fusan line. Pop. 60,000.

FUSARO, LAGO (40° 50′ N., 14° 2′ E.), ancient *Acherusia*, small lake. Campania, Italy; oysters.

FUSE. Explosives are usually fired by detonators containing mercuric fulminate; these ignited by fuses; three classes: (1) slow-burning, safety, or time fuses; (2) quick-burning and detonating fuses; and (3) electrical fuses. (1), used in mining, consists of core of compressed gunpowder surrounded by waterproof yarn or twisted hemp, burning in former case at rate of a foot in thirty seconds and in latter case at rate of a yard in eight hours. (2) and (3) are employed in military and naval service.

FUSELI, HENRY (1742-1825), Anglo-Swiss artist and art critic; *b.* Zurich; after studying in Italy he settled in England; elected R.A. (1790), and prof. of Painting at the Academy (1799). His paintings, including *The Nightmare* and numerous illustrations of Shakespeare and Milton, are distinguished by a weird and fantastic beauty; wrote extensively on art subjects, and his *Lectures on Painters* are of great critical value.

FUSEL-OIL, strong-smelling liquid formed in fermentation; contains large quantity of amylic alcohol ($C_5H_{12}O$); used in oils, varnishes, etc.; present in inferior spirits.

FUSILIER, foot-soldier, formerly armed with *fusil*, a kind of musket.

FUSION, the melting of a substance. Most substances exist both as liquids and solids. When the solid passes into the liquid state it either does so abruptly at one definite temperature, called the *Melting or Fusion Point*, or it does so gradually, in which case there is no definite melting-point. Substances with a definite melting-point are said to be examples of crystalline fusion. They require a certain definite amount of heat to transform them into liquid (*latent heat of fusion*), and the process is accompanied by a change of volume. Thus water, bismuth, and iron expand on solidification, while paraffin contracts. With these substances there is a certain temperature and pressure at which both the liquid and solid exist side by side. Substances which do not change their state at a definite temperature, do not give evidence of any latent heat, show no change in volume, and cannot exist as liquid and solid at the same time. This is *amorphous* fusion.

But if two substances capable of existing as solid and liquid side by side are mixed together in the liquid state they may solidify in varying proportions at varying temperatures, so that a mechanical mixture of them in the solid state is obtained. For a given temperature and pressure the composition of the mixture is always the same. Such mixtures when composed of metals are termed alloys, and differ in properties from their constituents.

FÜSSEN (47° 34′ N., 10° 44′ E.), town, on Lech, Bavaria, Germany; rope-making.

FUST, JOHANN (*d. c.* 1466), Ger. printer of eminence; was sometime associated with Gutenberg. There has been considerable controversy as to which of the two was the actual inventor of printing. The facts seem to be that F. advanced capital to G. to develop his business, and, litigation ensuing, F. commenced a rival concern in partnership with another.

FUSTEL DE COULANGES, NUMA DENIS (1830-89), Fr. historian; *b.* Paris; grad. as doctor, 1858; prof. of History, Strassburg, 1860-70; lecturer at École Normale Supérieure, 1870; prof. at Paris, 1875; prof. of Mediæval History at Sorbonne, 1878; director of École Normale, 1880; pub. several hist. works, including *La Cite Antique*, 1864. A systematic, conscientious historian.

FUSTIAN, kind of cotton cloth of heavy weaving, coarse in texture.

FUSUS, or **SPINDLE SHELL,** a genus of gasteropods. The *F. antiquus* is common in England; it is frequently dredged with oysters and is used for bait, but rarely eaten. The canal for the breathing siphon is long and tapering; the spire is tall and many-whorled. Usually the shell is some 6 in. long, but the *F. colosseus* is twice that length.

FUTURES, DEALING IN, term used in produce and cotton-market speculations relating to future deliveries of goods not yet in the market. When persons deal in f's they are gambling on future fluctuations in prices, and to bring about the desired rise or fall to their own advantage they seek to influence the market in that direction. Thus the producer and consumer suffer, and the entire gain falls to the speculator.

FUTURISM. See IMPRESSIONISM.

FYNE, LOCH, an inlet of the sea in Argyllshire, Scotland, extending in a northerly and northeasterly direction from the Sound of Bute, as far as Inverary, having the district of Cantire on the W. and Cowal on the E. On its W., also, is Loch Gilp, and the town of Inverary is on this side of the loch. It is famous for its herrings.

FYZABAD, FAIZABAD (26° 46′ N., 82° 11′ E.), city, district, and division in United Provinces, India. District: area, 1740 sq. miles; pop. 1,225,374. Division: area, 12,113 sq. miles; pop. 6,856,000. Fyzabad (town), on Gogra, near site of ancient Ajodhya; rice, cotton, sugar. Pop. 74,076.

G

G, seventh letter of Rom. alphabet; in Lat. always hard, so in Eng., except in Romance words, (*e.g.*) gentle. In O.E. *g* was soft in words *geong* (young), *soelig* (blessed).

G, in music, is the fifth tone of the natural diatonic scale of C.

GABBRO, important group of plutonic rocks of crystalline and coarse-grained structure, containing felspar and diallage; occasionally found in thick layers, brown or dark green in color, and widely distributed.

GABELENTZ, HANS CONON VON DER (1807-74), Ger. ethnologist and linguist; distinguished for his extensive knowledge of ancient and modern languages and dialects; author of numerous text-books and grammars.

GABELLE, oppressive Fr. salt-tax; abolished latter part of XVIII. cent.

GABERDINE, loose, outer garment, once much worn by the Jews.

GABES (33° 53′ N., 10° 4′ E.), seaport town, on Gulf of Gabes, Tunis, Africa; dates. Pop. 12,000.

GABII, ancient hist. town, near Rome, Italy; according to legend was early home of Romulus.

GABINIUS, AULUS (*d.* 48 or 47 B.C.), Rom. general; enacted Gabinian Law, 67 B.C.; consul, 58 B.C.; Syrian proconsul, 57-4 B.C.; exiled for extortion; recalled, 49 B.C.

GABION, basket-shaped frame, with open ends, which is placed on end, and filled with earth; used in fortification.

GABLE, in arch. triangular part of the upper wall of a building enclosed by the slopes of the roof. The g. was a distinctive feature, and used with much decorative effect in half-timbered architecture.

GABLONZ, tn., Czecho-Slovakia (50° 44′ N., 15° 12′ E.), on the Neisse, 8 m. by rail S.E. of Reichenberg; center of glass industry, also cottons, woolens, and cardboard. Pop. 29,600.

GABOON. SEE GABUN.

GABORIAU, ÉMILE (1835-73), a French writer of detective novels, was born at Saujon. He began by wiring for the Parisian papers and became famous at once when his story *L'Affaire Lerouge* was published in 1866 in *Le Pays.* He quickly wrote others: *Le Crime d'Orcival,* 1868; *Monsieur Lecoq,* 1869; *Les Esclaves de Paris,* 1869; *La Vie Infernale,* 1870; *L'Argent des Autres,* 1874.

GABRIEL, in *Book of Enoch* and Christian Church one of four archangels, the others being Raphael, Michael, Uriel.

GABRILOVITCH, OSSIP (1878), Russian pianist; *b.* St. Petersburg. He studied at the St. Petersburg Conservatory of music under the direction of Rubinstein and Tolstoff and later with Navratil and Leschetizky at Vienna. He won the Rubinstein prize in 1894 and made his debut at Berlin in 1896. Subsequently he made successful tours in various European countries and in 1900 made his appearance in this country. In 1909 he married Miss Clara Clemens, the daughter of S. L. Clemens (Mark Twain). He has appeared in most of the large cities of the country, and since 1918 has been conductor of the Detroit Symphony Orchestra.

GABUN (0° 15′ N., 9° 20′ E.), district and river of Fr. Equatorial Africa (*q.v.*); G. estuary receives several rivers; on N. bank is settlement of Libreville; unhealthy climate. G. in 1886 was annexed to the Fr. Congo, now Fr. Equatorial Africa.

GAD.—(1) Jacob's seventh son, founder of Israelite tribe of G. (2) Seer, connected with David; occurs in *Samuel* and *Chronicles.*

GADAG, GARAG (15° 25′ N., 75° 40′ E.), town, Bombay, India; cotton and silk manufactures. Pop. 31,000.

GADARA, modern Um-Keis (32° 37′ N., 35° 43′ E.), ancient town, Syria, in the Decapolis; famous hot springs; conquered by Antiochus the Great, 218 B.C.; besieged by Jannæus; rebuilt by Pompey.

GADDI, GADDO (*c.* 1239-1312), Ital. (Florentine) artist; famous as fresco painter and mosaicist. His *s.*, Taddo G. (*c.* 1300-66), a pupil of Giotto, and his grandson, Agnolo G. (*c.* 1350-96), were also greatly distinguished in the same kinds of art.

GAD-FLIES, BREEZE-FLIES, HORSE-FLIES, or **CLEGGS** (*Tabanidoe*), large flies, the females of which have piercing mouth-parts, and cause much irritation to man, horses, and cattle by blood-sucking.

GADOLINIUM. Gd. A metallic element discovered in 1880 by Marignac in samarskite. Its salts were first prepared in the pure state by the French chemists Urbain and Lacombe in 1904. The salts are colorless and the oxide Gd_2O_3 is white. With europium and terbium, gadolinium forms a small group of metals known as the terbium group. The solubilities of its salts are intermediate between those of the other two metals. It is, at present, of no commercial importance.

GADSDEN, a city of Alabama, in Etowah co., of which it is the county seat. It is on the Chattanooga Southern, the Louisville and Nashville, the Southern, and the Nashville, Chattanooga and St. Louis railroads, and on the Coosa river. It is surrounded by an important mining region and among its industries, which are important, are steel mills, lumber mills, foundries, machine shops, car works, and plants for the making of doors, blinds, flour, wagons, etc. There is a handsome post-office and school buildings. Pop. 1920, 14,737.

GADSDEN, JAMES (1788-1858), American diplomat, *b.* and *d.* in Charleston S. Carolina. Graduating from Yale College in 1803 he fought bravely in the war of 1812. In 1818 he was appointed aide-de-camp to General Jackson in the campaign against the Seminole Indians: was military inspector of the Southern Division in 1820, and took a leading part in the removal of the Seminoles to Southern Florida. Appointed Minister to Mexico. He negotiated the Gadsden treaty which established a new boundary between the United States and Mexico, December 30, 1853.

GADSEN PURCHASE, name applied to an area of 45,535 sq. miles forming the southern part of what is now New Mexico and Arizona, acquired by the United States from Mexico by virtue of the Gadsden Treaty, 1853-54. The United States paid for the new territory and for the release from certain obligations that it had incurred by failing to prevent Indian border depredations the sum of $10,000,000, while Mexico granted to the United States certain privileges with regard to the transportation of mails and supplies across the Isthmus of Tehuantepec. By this purchase irritating boundary questions between the two nations were settled to their mutual benefit.

GAEKWAR, title of the Mahratta princes of Baroda, who, under Damaji I., secured supremacy in Gujarat during early part of XVIII. cent.

GAELIC, or **ERSE LANGUAGE AND LITERATURE,** the language spoken by the Highlanders of Scotland, named by them Gaelic, but often called by the Lowlanders Erse or Ersh which is manifestly a corruption of Irish. To this dialect of the Celtic languages belongs that also spoken in Ireland and the Isle of Man. There are some differences in the tongue spoken in these three localities, but not sufficiently distinct to mark them as separate languages. The Gaelic is copious, rich and expressive and capable of great eloquence and power. It has no affinity with Greek or Latin, but rather resembles the Hebrew, especially in the inflection of nouns and conjugation of verbs.

The earliest Gaelic writings extant date back to the 7th century, though there is reason to believe that before that date writings existed that have been destroyed during the incursions of Danes and Northmen. The earliest literary forms were those embodied in the sagas or song-stories reciting the deeds of gods, demi-gods and national heroes. Many of these were pagan in spirit, though later they were marked by accretions from Biblical story. They may be roughly divided into three cycles: the Mythological, the Heroic and the Ossianic. The first deals with stories representing the successive settlements of Ireland, and in these the gods and demi-gods figure largely. The second group of sagas recite the history of the conquering Milesian race who dominated Ireland until the coming of the English. The third concern themselves with the exploits of Fionn or Finn, a national hero, about whom cluster a vast number of songs and stories making up the body of Fenian literature. In the 17th cent. the bardic features gave way to historical, antiquarian and biographical compositions by men of deep learning. In the last two decades of the 19th cent. there was a notable revival of interest in the study of the Gaelic tongue and the preservation of Gaelic literature which has continued to the present and has enlisted the co-operation of a large body of enthusiastic and accomplished scholars.

GAELIC LEAGUE, an organization formed in 1893 in Dublin, Ireland. Its program as announced was:

1. The preservation of Irish as the national language of Ireland and the extension of its use as a spoken tongue.
2. The study and publication of existing Irish literature and the cultivation of a modern literature in Ireland.

The movement had its genesis in the alarm felt at the rapid disappearance of Gaelic as the national tongue of Ireland. Under British domination, unceasing attempts had been made to repress its use in favor of English. These had been so successful that whereas at the beginning of the 19th century 4,000,000 out of a population of 7,000,000 spoke Irish as their native tongue, only about 640,000 spoke it in 1901.

The Gaelic League began its work under great difficulties, chief of which was the apathy of the people. Gradually however its efforts began to tell, a national sentiment was created and some of the best minds in Ireland gave in their adhesion to the movement. Thousands of pamphlets and books, exclusively Gaelic, made their appearance, and by 1906 about 100,000 children were learning Irish in the national schools. Ancient Irish classics were rescued from oblivion and a body of new Irish literature began to be formed. Sermons were preached and public prayers recited in Gaelic. Professorships of Gaelic and Celtic philology were established in Irish Universities. The establishment of the Irish Free State in 1922 gave a marked impetus to the movement.

GAELS. See SCOTLAND, IRELAND.

GAETA (41° 12′ N., 13° 35′ E.), fortified seaport, Caserta, Italy; ancient *Caieta*; cathedral; abp.'s see; resort of wealthy Romans in ancient times; frequently besieged; became refuge of Pius IX., 1848, of Francis II. of Naples, 1860; has active coasting trade. Pop. 6,000.

GAETANI, CAETANI, noble Rom. family to which Pope Boniface VIII. (1294-1303) belonged; still holds distinguished place among Rom. nobility.

GÆTULIA (*c.* 33° N., 0°), ancient region, N. Africa, S. of Mauritania and Numidia, embracing N.W. part of Sahara; inhabited by warlike tribe called Gætuli, noted rearers of horses; conquered by Rome, 6 A.D.

GAFF (1) The name given to an implement used by fishermen for helping to land a fish. It consists of a small spear with a hook or fork at the end. (2) A nautical term used to denote a boom used by sailors to extend the upper end of the sails used by ships rigged fore and aft.

GAGE, LYMAN JUDSON (1836), Amer. financier and cabinet officer; *b.* De Ruyter, N.Y. He was educated at Rome Academy, N.Y., entered the Oneida Central Bank at the age of 17 and in 1855 went to Chicago. He was clerk in a planing mill until 1858, when he entered the services of the Merchants Loan and Trust Company, advancing to the post of cashier. In 1868 he became cashier of the First National Bank of Chicago, was promoted to the vice presidency in 1882 and in 1891 became the president of that institution. He served as secretary of the Treasury in the cabinets of Presidents McKinley and Roosevelt 1897-1902, and was president of the U.S. Trust Company, N.Y.C. from 1902 until 1906, when he retired. He has been connected as director with many financial and business corporations. While in Chicago, he was a prominent figure in organizations looking toward civic reform and social betterment.

GAGE, THOMAS (1721-87), Brit. general; served in Flanders, at Culloden, and under Braddock in America; became Gov. of Massachusetts.

GAHNITE, an ore of zinc belonging to the class known as spinels. It varies in composition, and many contain several elements other than zinc. Part of the zinc may be replaced by iron or magnesium. The general formula may be given as $(ZnFeMg)\ (AlFe)_2O_4$.

GAILLARD, DAVID DU BOSE (1859-1913) American soldier and engineer. *b.* in Sumter county, South Carolina in 1859; died in 1913. He graduated from the West Point Military Academy in 1884 and was a member of the International Boundary Convention of United States and Mexico 1891-94 and superintended the building of the Washington aqueduct 1895-1898. In the Spanish War he was Colonel of a regiment of volunteer engineers: appointed Lt. Colonel in the regular army in 1909. A member of the Isthmian Commission in 1907 he became a director of the Panama R.R. and subsequently was engineer of a division of the Panama Canal from Gatun to Pedro Miguel. Author *Wave Action in Relation to Engineering Structures*, 1904.

GAILOR, THOMAS FRANK (1856), American Protestant Episcopal Bishop. *b.* at Jackson, Miss. Sept. 17, 1856. Educated at the Racine, Wis. College; A.B. General Theological Seminary, N.Y.; D.D. 1893. Oxford, England, 1920; LLD Oglethorpe, 1921. Ordained priest of the P.E. Church 1880, rector of Church of the Messiah, Pulaski, Tenn., 1879-1882; professor of ecclesiastical history 1882-1890; vice-chancellor University of the South, 1890-1893; bishop coadjutor 1893-1898, and bishop after the death of Bishop Quintard, February 1898: chancellor of the University of the South since 1908: chairman of the House of Bishops P.E. Church in 1916 and presiding bishop in 1919. Author *Manual of Devotion*, 1887; *The Apostolic Succession*, 1889; *Things New and Old*, 1891; *The Puritan Reaction*, 1897; *Apostolic Order*, 1901; *The Episcopal Church*, 1914.

GAINES, CLEMENT CARRINGTON (1857), College President. *b.* in Virginia. Bachelor of Arts, Hampden-Sidney College, 1875; Master of Arts, 1897. In 1882 graduated from Eastman Business College. In 1910, Doctor of Laws, Syracuse University. 1875-76 at Fincastle High School taught Latin and mathematics. Was principal of Oakland Institute and high school in Virginia. 1883, in Chicago practiced law. 1884, in Eastman Business College, taught banking. Since 1884 president of Eastman College. In 1892 established Eastman-Gaines School and has since been president. Was first president of Association of Registered Business Schools. Was made president and proprietor of Riverview Academy by Poughkeepsie Chamber of Commerce. In 1919 was appointed member of Board of Education at Beacon, New York. Author of *The Farmer and his Future*, 1895; *Simplified Shorthand*, 1897; *Practical Bookkeeping*, 1899; *Arithmetic for Business*, 1904.

GAINES, FRANK HENRY (1852), College President. *b.* in Tennessee. Bachelor of Arts, in 1870 of Cumberland University, Tennessee. In 1876 Bachelor of Divinity of Union Theological Seminary. Was Doctor of Divinity and Doctor of Laws of Davidson College. Was ordained Presbyterian Minister in 1876. From 1876-1878 was pastor at Hopewell and Clintonville, Kentucky. At Hebron Church, 1878-1884. Falling Spring Church, Virginia, 1884-1888. Was president from 1896 of Agnes Scott College. Author of *Bible Course, Outline and Notes*, 1895.

GAINES' MILL, a place near Richmond, Va., near which occurred the battle of Cold Harbor, called also the battle of Gaines' Mill, which was fought on June 22, 1862, between a portion of General Lee's army and a part of the Union forces under General McClellan. Here also on June 3, 1864 the Confederates repulsed the attack of the Union forces commanded by General Grant.

GAINESVILLE, a city of Florida, in Alachua co., of which it is the county seat. It is on the Seaboard Air Line, the Atlantic Coast Line, and the Tampa and Jackson railroads. It is surrounded by an important agricultural and stock raising region and among its industries are lumbering and the mining of phosphate. There are plants for the making of wagons, planing mills, etc. Gainesville is a well known summer resort and is the seat of the University of Florida. Pop. 1920, 5,286.

GAINESVILLE, a city of Georgia, in Hall co., of which it is the county seat. It is on the Southern, the Gainesville Northwestern, and the Gainesville Midland railroads. Its industries include the manufacture of cotton goods, cotton yarns, asbestos, cottonseed oil, brick, etc. Here is Brenau College and a conservatory of music for young women. The town is also the seat of the Riverside Military Academy. Pop. 1920, 6,272.

GAINESVILLE, a city of Texas, in Cooke co. It is on the Gulf, Colorado and Santa Fe, and the Missouri, Kansas and Texas railroads, and on Trinity river. It is the center of an important agricultural and stock raising region and its extensive industries include flour mills, pressed brick works, iron foundries, machine shops, etc. The attractive public buildings include a city hall and a library. There is also a park. Pop. 1920, 8,648.

GAINS, MYRA CLARK (1805-85), a famous litigant whose *f.* had owned a large estate in New Orleans. At his death she was obliged first to establish the fact of her legitimacy, and from 1832 to her death she fought in the courts for her property, which had fallen into the hands of others. She finally won the decision in the United States Supreme Court, but in the meantime the costs of the litigation had eaten up the value of the property. She obtained nothing.

GAINSBOROUGH (53° 24′ N., 0° 45′ W.), town, on Trent, Lincolnshire, Eng.; has an old Manor House, built by Duke of Gaunt; linseed cake and agricultural machinery manufactured. Pop. 20,000.

GAINSBOROUGH, THOMAS, R.A. (1727-88), Eng. artist; *b.* Sudbury (Suffolk); *s.* of a small tradesman; studied engraving, and afterwards set up as an artist, first at Ipswich, and afterwards at Bath and London. He was one of the greatest portrait-painters England has produced, and though his landscapes were not appreciated in his own day, they are now considered only less valuable than his portraits. His picture, The Blue Boy, was sold in the United States in 1923 for $500,000.

GAIRDNER, JAMES, LL.D., C.B. (1828-1912), Brit. historian; *b.* Edinburgh; wrote chiefly on Plantagenet and Tudor kings, and edited *The Paston Letters.*

GAISERIC, GENSERIC, first Vandal king of Africa (*c.* 390-477), conquered and ruled Africa 439-77; a crafty politician, noted general, and treacherous oppressive ruler.

GAIUS, Rom. jurist; author of the *Institutes*—a complete exposition of elements of Rom. law; a treatise on the Edicts of the Magistrates, and Commentaries on the Twelve Tables; written under influence of Traditionalists, between 130 and 180 A.D.

GAIUS CÆSAR, CALIGULA (A.D. 12-41), succ. Tiberius as Rom. emperor, 37 A.D.; a tyrannical, cruel, profligate ruler; assassinated.

GALABAT, GALLABAT (12° 58′ N., 36° 12′ E.), town, Anglo-Egyptian Sudan, on W. borders Abyssinia; trading center.

GALACTOSE. $C_6H_{12}O_6$. A sugar formed from milk sugar, or lactose, by hydrolysis. It is also produced when gum arabic and other gums are boiled with dilute sulphuric acid. It crystallizes in prisms which melt at 166° C. On oxidation with nitric acid it yields first galactonic acid and finally mucic acid. On reduction with sodium amalgam and water it is converted into the alcohol dulcitol, or dulcite. Galactose belongs to the same group of sugars as fructose (fruit sugar) and glucose (grape sugar).

GALAGO, a genus of Primates resembling the Lemur; in size less than a cat, but having large eyes and ears and a long tail; now placed in family Nycticebidæ.

GALAHAD, hero of Arthurian group of legends, s. of Lancelot; from secondary position in earlier legends became central figure as successor of Perceval.

GALANGAL, drug prepared from the root of a plant, *Alpinia officinarum,* of natural order *Zingiberaceoe,* growing in southern China; still used in parts of Russia and China medicinally and as a flavoring agent, having a peppery taste but is not now used except in the above places, although a favorite drug of mediæval physicians.

GALAPAGOS ISLANDS (*c.* 0° 30′ S., 90° 30′ W.), group of some thirteen islands, belonging to Ecuador, lying in Pacific Ocean. Total area, *c.* 2940 sq. miles. The largest island, Albemarle, is *c.* 60 miles long. Islands have dense vegetation in S. but covered with lava in N., resulting from numerous volcanoes —some still alive; chief crop, sugar. The islands are famous for the large lizards and the giant tortoise which are found there. Pop. *c.* 400.

GALASHIELS (55° 37′ N., 2° 49′ W.), town, on Gala, Selkirkshire, Scotland; noted woolen manufactures; iron and brass foundries. Pop. 12,800.

GALATEA, personage in Gk. and Rom. mythology. (1) A nymph wooed by Cyclops Polyphemus, who crushed his rival Acis under a rock. (2) Shepherdess in third Eclogue of Vergil, typifies feminine coquetry. (3) Statue of ivory loved by Pygmalion, and endowed with life by Aphrodite.

GALATIA, an inland country of Asia Minor, chiefly remarkable as the home of a Christian colony to whom St. Paul addressed the *Epistle to the Galatians.*

GALATIANS, EPISTLE TO THE.—This epistle of St. Paul, authenticity of which has scarcely been impugned, is the only one addressed by the apostle to a group of churches. Its exact date has not been established, though it was probably written in 57 or 58 A.D., between the writing of 2 *Corinthians* and *Romans,* and during Paul's third missionary journey, while he was at Ephesus or Corinth or on the way between the two. Its object was to counteract the Judaic teaching which for some time had been undermining Paul's work in the Galatian Church. May be divided into three parts, of which the first is a vindication of the author's independence as an apostle of Christ; second is doctrinal, showing that the Gospel dispensation is the fulfillment of the law; third is practical, showing that the believer's life should be the expression of his faith.

GALATZ, riv. port, episc. see, Moldavia, Rumania (45° 50′ N., 28° 4′ E.), on l. bk. of Danube, 10 m. above junction with Pruth; iron, copper, candle, and soap industries; exports grain, meal, and timber; trade passing to Braila; seat of Danube Commission. Bombarded by the Germans on Jan. 14, 1917, and abandoned after destruction of much grain in the elevators. Pop. 73,500.

GALAXY, in astron., the Milky Way, the belt of luminaries stretching across the heavens; hence, any splendid gathering.

GALBA, SERVIUS SULPICIUS (5 B.C.-69 A.D.), Rom. emperor; prætor

20; consul 33; gov. of Hispania Tarraconensis, 61; emperor, (June 68–Jan. 69 A.D.); assassinated by rebels.

GALBA, SERVIUS SULPICIUS (*fl.* 150), celebrated Rom. orator and general; consul, 144.

GALBANUM, gum resin, yellowish brown, containing umbelliferone, derived from exotic plants (*feruloe*); has bitter taste; used in medicine externally as irritant, internally as digestive; also to make varnish.

GALDÓS, BENITO PEREZ (1845-1918), Spanish novelist. *b.* at Las Palmas, Canary Islands. He began his career as a novelist with stories based on history. A work in 30 volumes *Episodios Nacionales* deals with the first three decades of the 19th century (1879 and on). His best known works have been mostly translated into English and include *Leon Roch*, *Donna Perfecta* and *Gloria*. His dramas include *Elektra*, 1901, and *Alma y Vida*, 1902. See Kelly 'Spanish Literature.'

GALE. See MYRTLE.

GALE, ZONA (1874), Amer. novelist and writer, *b.* at Portage Wis. Graduated from the University of Wisconsin in 1895. She wrote for the newspapers of Milwaukee 1901-1903 and then for the New York World and various periodicals for several years. Publications *Romance Island*, 1906; *Loves of Pelleas and Etarre*, 1907; *Friendship Village*, 1908; *Friendship Village Love Stories*, 1909; *Mothers of Men*, 1911; *Christmas*, 1912; *When I was a Little Girl*, 1913; *Neighborhood Stories*, 1914; *Daughter of Tomorrow*, 1917; *Birth*, 1918; *Peace in Friendship Village*, 1919; *Miss Lulu Bett*, 1920; *The Sacred Way*, 1921; *Faint Perfume*, 1923. A dramatic version of *Miss Lulu Bett* was produced at the Belmont Theatre, New York City in December, 1920, which Columbia University awarded the $1000 Pulitzer prize as the best play of the year.

GALEN, or **CLAUDIUS GALENUS** (130-*c.* 200 A.D.), physician; *b.* at Pergamos, Asia Minor; practiced medicine with very great success, chiefly in Rome; author of many works on logic, ethics, and medicine, his writings on the latter being the guide for physicians for several cent's; one of the founders of science of anatomy.

GALENA, a city of Illinois, in Jo Daviess co. It is on the Illinois Central, the Chicago and Northwestern, the Burlington, and the Chicago, Great Western railroads, and on Galena river, near its junction with the Mississippi. The town has important industries, including smelting works, marble works, machine shops, planing mills, etc. It also has a large trade in farm and dairy products. It has steamboat connection with important points on the Mississippi river. The town is chiefly famous as being the early residence of General Grant, to whom a memorial was erected. Its name is taken from the numerous lead mines in the neighborhood. There are also important mines of zinc. Pop. about 5,000.

GALENA (PbS), sulphide of lead, possesses a light bluish white metallic lustre. Practically all the lead of commerce is made from this ore, which contains traces of silver.

GALEOPITHECUS, FLYING LEMUR, a vegetarian arboreal Insectivore, so peculiar that it is often placed in a separate order. Hind and fore limbs are connected by a fold of skin, so that the creature can parachute from one tree to another.

GALERITES, fossil sea urchin found widely in Cretaceous; shape conical; shell oval; base flat; mouth in middle of under surface.

GALERIUS, VALERIUS MAXIMIANUS (*fl.* 305-11), Rom. emperor; from common soldier rose to be Diocletian's son-in-law and successor.

GALESBURG, a city of Illinois, in Knox co., of which it is the county seat. It is on the Chicago, Burlington and Quincy, and the Atchison, Topeka and Santa Fe railroads. The city is an important industrial center and has the car shops of the Burlington railroad. Other industries include stock-yards, brick-making plants, boiler works, iron foundries, etc. It is the distributing center for a large wholesale and jobbing trade. Galesburg has several well known educational institutions including Knox College, Lombard College, St. Mary's school, and St. Joseph's Academy. There are parks, hospitals, and a public library. Pop. 1920, 23,834.

GALGACUS (I. cent. A.D.), famous Caledonian chieftain, routed by Agricola in Scotland at the battle of the *Grampians.*

GALIANI, FERDINANDO (1728-87), Ital. economist; *b.* Chieti; Neapolitan ambassador at Paris, 1759-69; his *Dialogues sur le commerce des bles* made his name in economic world; concerned mainly with question of freedom of corn trade.

GALICIA (42° 25′ N., 8° W.), ancient kingdom and province of Spain, now captaincy-general; divided into four provinces of Corunna, Lugo, Orense, and Pontevedra; surface generally mountainous and well watered; climate mild; coast-line much indented; has many good harbors, of which Ferrol is one of finest naval ports of Europe; principal river, Minho; minerals—lead, tin, copper, iron; inhabitants mostly agriculturists, but agriculture is backward; chief exports—timber, cattle, sardines; capital, Corunna. Area, *c.* 11,250 sq. miles. Pop. 2,089,000.

GALICIA, formerly crown-land of Austria (49° 50′ N., 23° E.), lying on N. side of the Carpathians, bounded on N.W. by the Vistula, and in its E. parts drained by the Dniester, Pruth, and Sereth; fine pasture and arable land, and immense forests; seized by Austria on the first partition of Poland, 1772. After World War that part W. of the San given to Poland; E. Galicia included in Ukraine. In the early months of the war the Russian armies overran Galicia almost to Cracow in the W. and as far S. as the Carpathian passes; in the summer of 1915 they were driven out, but again advanced in the E. part in their offensive of July 1917, thereafter retreating to their own frontiers. Pop. 1920, 8,257,505. See under WORLD WAR.

GALILEE, province of Palestine; bounded N. by Leontes, E. by Jordan, S. by Samaria and Carmel Mountains, W. by Phœnicia and Mediterranean. Greatest length, *c.* 60, breadth, 35 miles. Chief interest lies in its being cradle of Christianity, whose founder passed His youth and began ministry here, performing first miracle at Cana, raising the widow's son at Nain; while the Transfiguration occurred at Mt. Tabor in the N.E.

GALILEE, porch, or small outer chapel, for penitents, attached to churches and cathedrals.

GALILEE, SEA OF (32° 47′ N., 35° 38′ E.), Sea of Tiberias, Lake of Tabariyeh or Gennesaret, lake in N. Palestine; length, *c.* 14 miles, and half as broad; lying almost 700 ft. below sea-level, and situated at bottom of volcanic basin. River Jordan enters from N.; W. side has good vegetation, but N. and E. sides are bare and rocky; figures largely in Bible as Sea of G.; formerly the ancient cities of Tiberias, Magdala, Capernaum, lay round it.

GALILEO GALILEI (1564-1642), Ital. astronomer; *b.* Pisa; his *f.*, a nobleman of Florence, procured him an excellent education in lit. and the arts, and in 1581 he entered the Univ. of Pisa. When nineteen G. investigated the laws of the oscillation of the pendulum, which he subsequently applied in the measurement of time. In 1589 he was made prof. of Math's in the Univ. of Pisa, and three years later filled a similar office in Padua, where he continued eighteen years, his lectures gaining for him a European reputation. He invented the type of telescope known by his name, and with the aid of his later and much-improved instruments made many remarkable observations. He noted the irregularity of the moon's surface, and showed how the heights of the mountains could be determined from their shadows. From his resolution of certain nebulæ into individual stars he concluded that the *Milky Way* might be similarly resolved with a telescope of higher power. His most remarkable discovery was that of the four largest satellites of *Jupiter.* He detected sun-spots, and inferred from their motion the rotation of the sun and the inclination of its axis to the plane of the ecliptic.

In 1610 Cosimo II., Grand-Duke of Tuscany, app. him grand-ducal mathematician and philosopher. His increased leisure G. devoted to further investigations of natural phenomena and the publication of numerous treatises. He brought fresh evidence in support of the Copernican theory by the discovery of the varying phases of *Mercury, Venus,* and *Mars.* In his later years he became more and more involved in controversy. Twice he was compelled by the Church to renounce his views on the Copernican system and philosophy, and to abstain from defending or teaching it. Domestic troubles and disease marred the last years of his life. In 1637 he became quite blind, though just previously he had discovered the diurnal libration of the moon, and seems to have known something of the libration in longitude. He died the year Newton was born, and was buried in church of Santa Croce, Florence.

GALION, a city of Ohio, in Crawford co. It is on the Cleveland, Cincinnati, Chicago and St. Louis, and the Erie railroads. It is an important industrial community and has railroad shops, carriage factories, wagon factories, lumber mills, and plants for the making of automobile gears, pipes, etc. There is a handsome public library. Pop. 1920, 7,374.

GALL, a term for bile, which is stored up in the gall-bladder; also a swelling on a horse, or a swelling formed on plants (*e.g.*), oak trees, resulting from certain parasites.

GALL, FRANZ JOSEPH (1758-1828), Ger. physician; practiced in Vienna; made researches in anatomy and physiology, and founded the science of phrenology, writing much and lecturing upon it throughout Germany and France, and also in London; author, in addition to phrenological works, of works on anatomy and physiology.

GALL, SAINT. See SAINT GALL.

GALLA, a race, numbering several millions, occupying parts of Abyssinia and Brit. E. Africa. They are of a fine physical type, brown-skinned, and show little trace of negro blood.

GALLAGHER, MICHAEL JAMES (1866), Roman Catholic Bishop. *b.* in Michigan. Was educated at Assumption College, Ontario, 1884-1885 and Mungret College, Ireland, 1885-1889. From 1889-94 at Innsbruck University, Austria. In 1893 was ordained priest of Roman Catholic Church. Was pastor at Carrollton, Michigan, and St. Andrews, Grand Rapids. In 1895 was bishop's secretary. 1900-12 was chancellor, Diocese of Grand Rapids. 1912-16 was vicar-general. In 1915 was consecrated coadjutor bishop of Grand Rapids. In 1916 succeeded as bishop of Grand Rapids. Was transferred in 1918, to See of Detroit.

GALLAND, ANTOINE (1646-1715), Fr. Orientalist and numismatist; traveled through Asia Minor, Syria, and Levant copying inscriptions and collecting coins, etc.; prof. of Arabic at College Royal, 1709; member of Academy; did much to stimulate interest in Eastern literature.

GALLATIN, ALBERT (1761-1849), Amer. statesman; *b.* Geneva, of ancient and honorable family; ed. Geneva; graduated, 1779; went to Massachusetts 1780, made his way south, and entered politics. In view of 1787 Constitution, G. was one of founders of Anti-Federalist party (afterwards the Republican). Chosen a Senator, 1793, but his election annulled 1794, partly because of unpopularity he incurred over Whisky Insurrection. Elected to House of Representatives, 1795, and secured leadership of Republican party. After 1798 his career was a remarkable triumph. Became Sec. of Treasury 1801 under Jefferson's presidency. Became minister to France, 1816. In 1826 he was in England over North-East boundary question. Retired, 1827.

GALLAUDET, EDWARD MINER (1837-1917), American educator of the deaf and dumb. *s.* of Thomas Hopkins Gallaudet. *b.* at Hartford, Conn. where he graduated from Trinity College in 1856. He became a teacher of the deaf and dumb at the institution his father had founded in Hartford. In 1857 he moved to Washington with his deaf and dumb mother, and founded the Columbia Institute for deaf and dumb which was developed and became Gallaudet College. He was appointed president in 1911. He went to Europe 1867-68 to study deaf and dumb institutions there, and published the resul of his investigations on his return to America. Author: *Manual of International Law, Life of T. H. Gallaudet*

GALLAUDET, THOMAS HOPKINS (1787-1851), Amer. deaf and dumb educationist; his sons, Thomas and Edward were associated with similar work.

GALLE, POINT DE GALLE (6° N. 80° 15′ E.), fortified seaport town, S.W coast Ceylon; formerly chief port o island; good harbor; exports tea, plumbago, and cocoanut oil. Pop. 39,000

GALLEON, term formerly given t Span. ships of war with three or fou batteries, and later to the largest Span merchant vessels—armed traders usuall with four decks. Two fleets sailed ever year from Spain—one to Mexico, th other to Peru; the former was know as 'the flota,' the latter as 'the galleons.

GALLERY, kind of room or separat part of room, length largely exceed breadth; underground passage, (*e.g.*) i mine; platform projecting from wall place for exhibition pictures.

GALLEY, vessel of war and commerce with oars (and also sails), rowed by slave and condemned criminals; long swif rowing-boat; ship's kitchen.

GALL-FLIES (*Cynipidoe*), a widel distributed family of Hymenopterou insects, which pierce and lay eggs i plants, a gall afterwards forming at th place, (*e.g.*) the mossy bedeguar gall o wild rose-bushes, caused by *Rhodite rosoe.*

GALLIA CISALPINA (*c.* 45° N., 10 E.), ancient province, N. Italy; originally inhabited by Ligurian, Umbrian Etruscan, and other races.

GALLIC ACID ($C_6H_2(OH)_3COOH$) produced by boiling tannin with dilut acid. Occurs in gall nuts, and with excess of ferric chloride forms dark green solution.

GALLICAN CHURCH, the nationa church of France, as it developed fro the time of Philip the Fair to th French revolution in opposition to papa jurisdiction. It was the rise of Gallicanism—a term which sprang from the disputes between the French monarchs an Rome—that stirred a religious ground swell in Europe against ecclesiastica authority. Gallicanism expressed nationalism in church matters. It aimed at national church that disclaimed deper dence upon the overlordship of the Pope and sought a curtailment of Rome's power side by side with an accession of ecclesiastical authority by the civil government. Church policy in France, in fact, reached the point when it affirmed the doctrine of state supremacy both in spiritual and temporal matters. The king, not the Pope, was the head of the church in France. Gallicanism conceded the pontiff's divine right over the whole Church, but demanded the independence of national churches, especially that of France, in local government.

Gallicanism brought kings and popes in frequent conflict. It culminated in a most emphatic pronouncement in 1682, when Louis XIV assembled the French bishops and clergy to formulate the creed of Gallican liberties. The four articles they framed affirmed that kings and princes were not subject to ecclesiastical power in temporal affairs; that the Pope's power in France was limited by the rules, customs and institutions of the French kingdom and church; and that the Pope's judgment in matters of faith was not final unless supported by the whole church. Successive popes condemned these declarations, though Louis XIV, as a sober afterthought, withdrew them, daunted by their radical tenor. Gallicanism waned, but was upheld by Napoleon, who reaffirmed the condition created by the declarations. Gallicanism may be said to have died by the growth of rationalism in France which weakened the conception of a national church, undermined the relations of the church with the state, and brought about their separation in 1905. The state, in short, was no longer a guardian of religion.

GALLI-CURCI, AMELITA (1889), coloratura soprano. *b.* in Milan, Italy. Educated at International Institute and Lyceum High School. Studied piano composition at Royal Conservatory, Milan and when graduated at 19 was appointed professor in conservatory. Was self-taught as vocalist. In 1909, at Rome made her professional debut as Gilda in 'Rigoletto.' Toured Spain, Italy and South America. Made her debut in United States with Chicago Opera Company. Was engaged for four seasons. Made New York debut in title role of 'Dinorah,' in 1918. Sang Violetta in 'La Traviata' with Metropolitan Opera Company, 1921. 1921-22 for the first time, sang title role in 'Madame Butterfly.'

GALLIENI, JOSEPH SIMON (1849-1916), Fr. general; fought in Franco-German War (1870-1); was with Fr. expeditions in basin of Upper Niger, 1877-81; commander-in-chief in Madagascar, 1896-1905; which he reorganized with conspicuous ability as a Fr. colony; appointed governor of Paris, Sept. 1914; rushed reserves from Paris in every available taxi and motor bus to augment 6th Army on the Ourcq under the leadership of Maunoury, where they persistently attacked von Kluck's flank and, though subsequently outflanked, played important part in first battle of the Marne.

GALLIENUS, PUBLIUS LICINIUS EGNATIUS (*fl.* 260 A.D.), Rom. emperor; notorious for his debauchery and weak government; killed by his soldiers.

GALLIFFET, GASTON ALEXANDRE AUGUSTE, MARQUIS DE, Prince de Martignes (1830-1909); Fr. soldier; served in Crimea, 1855, Italy, 1859, Algeria, 1860, Mexico, 1863, and Franco-Ger. War; War Minister, 1899-1900.

GALLINACEOUS BIRDS, GALLINÆ, order of birds of ground habits; heavy and ill adapted for long flight, (*e.g.*) fowls, guinea fowls, turkeys, pheasants, grouse, partridges.

GALLINGER, JACOB HAROLD (1837-1918), physician and politician. *b.* at Cornwall, Ontario, Canada, *d.* at Franklin, New Hampshire. After a common school education he became a printer, and graduated as a physician in 1858, practicing until elected to Congress for N.H. in 1872, being re-elected 1873 and 1891 and was chairman of the Republican State Committee. He was state senator 1878-79, and 1880: surgeon-general of New Hampshire, 1879-80: Chairman Republican State Convention 1882 to 1890 when he resigned: again elected in 1898 and served until 1908; Chairman from his state to Republican National Conventions 1888, 1900, 1904, 1908; chairman of Merchants Marine Commission 1904-05; member National Forest Reserve Commission, and of National Waterways Commission. President pro tempore of Senate part of 42nd Congress; elected to 49th and 50th Congress, declining to run for the 51st. Succeeded Henry W. Blair to U. S. Senate, March 1891, re-elected 1897, 1903 and 1909 and in 1914 by popular vote.

GALLIPOLI. (1) Peninsula, Greece formerly European Turkey (40° 4′-40°38′ N. 26° 14′-27° E.), between Gulf of Saros (Xerxes) and Strait of Dardanelles, a tongue of land, 53 m. in length and varying in width from 12 to 2 or 3 m. It is mostly a mass of rocky ridges, covered with dense scrub and scored with gullies and ravines (*nullahs* and *deres*), with stunted forests in the hollows. There is little cultivation, except for a cypress or olive grove here and there, few villages and no properly engineered roads.

The only considerable strip of level ground is around Suvla Bay. Inland the hills rise steeply: in the W. to the Anfarta ridge, in the S. to the abrupt mass of Sari Bair, 970 ft. The N. and W. shores are rugged, except for a few beaches at Anzac Cove, and round the tip of Capes Helles and Tekke. On the S. shore there are small natural harbors at Maidos and at Gallipoli town. In the S. extremity rises the lonely peak of Achi Baba, 730 ft., commanding the beaches about Helles, with the little village of Krithia on its S.W. slope. The isthmus connecting the peninsula with the mainland at the small town of Bulair has been strongly fortified by many races in all ages. (2) Seaport, at head of Dardanelles, on European side, 130 miles W. S.W. of Constantinople, was the first Turk. possession in Europe, 1354. It lies in an agricultural area, which formerly produced vines. During the Gallipoli campaign it was the headquarters of the naval defense of the strait and an important point in Turk. communications with Constantinople. Pop. (largely Greek) *c.* 30,000.

GALLIPOLI, CAMPAIGN IN, undertaken after the failure of the unsupported naval attack on the Dardanelles on March 18, 1915. Between that day and the landing of the Brit. forces on the Gallipoli peninsula more than six weeks elapsed, and in the interval the enemy had so entrenched and fortified the terrain that the task had become almost insuperable. Lord Kitchener selected General Sir Ian Hamilton to command the expedition. Hamilton's original force numbered 120,000, and consisted of the splendid 29th Division (eleven regular battalions and a Territorial battalion—the Royal Scots), two naval brigades, a brigade of marines, the Australian and New Zealand (Anzac) division, some Indian troops, and the E. Lancashire Territorial Div. The Fr. force, led successively by Generals d'Amade, Gouraud, and Bailloud, consisted of marines, colonial troops, and the Foreign Legion. The leaders of the opposing Turks were von Sanders and Enver Pasha.

Using the port of Mudros in Lemnos as a base, the Allied transports assembled before dawn on April 25, 1915. Three major and two minor landings were effected at the tip of the peninsula, but at a great sacrifice of life. Equally serious losses were sustained at Gaba Tepe, where the Anzacs secured a footing. Meanwhile a small Fr. force seized Kum Kale, on the Asiatic side, to silence the batteries. See MAP OF NEW STATES OF S. E. EUROPE.

The front line extended from the mouth of the Gighir (on the Ægean) to Eski Hissarlik (on the Straits); in the Anzac sector it ran from Chailak Dere to Gaba Tepe, a total front of about 12 m. Repulsing the violent night attack of May 1, the Allies counter-attacked next day. Then followed a series of battles which culminated in the onslaught of May 8. At the close of three days' struggle an advance of 1,000 yds. had been made. On June 4 a second furious attack was made, and the line was pushed forward from 200 to 400 yds. Another thousand yards was gained on the left on June 28, and the dominating height of Achi Baba was almost turned. On June 29-30 the Turks were driven back in the Anzac sector with a loss of some 8,000 killed and wounded. On July 12 a resolute attempt was made on Achi Baba, but a gain of 400 yds. was the only result.

On the afternoon of the 6th a frontal attack was made on the Lone Pine plateau, as a feint to cover an Australian division which was to work up three ravines towards Koja Chemen Tepe, the commanding summit of Sari Blair. The whole left of the Anzac position was safeguarded by this advance, and during the night the left column, under heavy fire and with frequent bayonet charges, pushed its way up the ravines between Rhododendron Ridge and Chunuk Bair. By nightfall it was entrenched on top of the ridge, 'a quarter of a mile short of Chunuk Bair—that is, of victory.' On the morning of the 8th, after severe losses, Chunuk Bair was occupied; but the late arrival of the no. 3 column, and the series of delays caused by the confusion of units, the excessive heat, and the lack both of water and of judgment, which prevented the advance of the Suvla Bay troops, wrecked the promising situation. By the morning of Aug. 9 the chance of success had vanished. Ever growing enemy reinforcements had arrived, and early on the morning of the 10th the Turks made a furious attack. The two battalions of the New Army which were then holding the line along Rhododendron Ridge up to Chunuk Bair 'died in the ranks where they stood.' Thus ended 'a tragedy of missed opportunity.' No further offensive was attempted. Liman von Sanders in his *Funf Jahre Turkei*, 1920, states clearly that if the outflanking movement had been continued after Suvla and a further landing made in the Gulf of Saros he had no troops to meet it.

On Oct. 16 Sir Ian Hamilton was recalled, and Sir Charles Monro was appointed to carry out the evacuation which he had already advised, and to which Lord Kitchener only consented after a personal examination. Meanwhile, decimated by dysentery, the

Allies suffered still further from the blizzard of Nov. 26-28. The evacuation, which was suprisingly successful, began on Dec. 8, and by Jan, 9, 1916, only deserted trenches, abandoned stores, and thousands of Allied graves remained as relics of the ill-starred adventure. The total losses during the campaign were about 115,000 in killed, wounded, and missing; the sick numbered about 100,000.

GALLIPOLIS, a city of Ohio, in Gallia co., of which it is the county seat. It is on the Hocking Valley, the Kanawha and Michigan railroads, and on the Ohio River. Surrounding it are important coal fields, the greater part of which have not been developed. Its industries include the manufacture of iron products, wood products, brooms, lumber, leather, etc. Here is the Ohio Hospital for Epileptics, and there is a public library, parks, and Gallia Academy. Pop. 1910, 6,070.

GALLITZEN, DEMETRIUS AUGUSTINE (1770-1840), Amer. priest; ordained 1795; founded R.C. settlement in Cambria county, Pennsylvania.

GALLIUM, a rare hard grey-white metal, belonging to the aluminum group, of specific gravity 5.95, melts at 30.15 and stays liquid at a lower temperature if untouched by crystals of the metal. Except mercury it is the only metallic element that remains a liquid in common temperature. It was discovered by the French chemist Lecoq de Boisbaudran by the spectroscope in 1875.

GALLON, liquid measure; comprises 4 quarts, or 277.274 cubic in.

GALLOWAY (55° N., 4° 15′ W.), district, S.W. Scotland, comprising shires of Wigtown and Kirkcudbright.

GALLOWAY, BEVERLY THOMAS (1863), Botanist. *b.* in Missouri. In 1884 at University of Missouri was Bachelor of Agriculture Science. From 1884-1886 assisted in horticultural department of University of Missouri. 1887-88 assistant Pathologist. Was pathologist and chief Division of Vegetable Pathology and Physiology, 1888-1900. 1901-1912 was chief Bureau Plant Industry. From 1913-14 was assistant secretary of agriculture of United States. At Cornell University, 1914-16 was dean of State College of Agriculture. In office of Seed and Plant Introduction, United States Department of Agriculture. Author of books on botany and horticulture.

GALLOWAY, JOSEPH (1731-1803), Amer. lawyer; pres. of Philadelphia Assembly, 1766-73; in Anglo-Amer. dispute advocated compromise, and wrote *Plan of a Proposed Union between Great Britain and the Colonies*, 1774; fought with Brit. army; retired to Eng., 1778, all his property being confiscated.

GALLOWS, wooden erection for hanging criminals, now consisting of two uprights and a cross-bar, but formerly of a single upright and a cross-piece. The latter was often called 'gibbet.'

GALLS.—Certain insects deposit their eggs in the tissues of plants, injecting at the same time a drop of irritating fluid. This causes increased growth of the plant tissues, which cover the egg and provide shelter and sustenance for the larvæ, forming a gall. G's are found on oaks, willows, currants, and pears. Many are brightly colored, but they vary in size, shape, and color according to the insects and the part of the plant attached, leaf or bud. If one member alone of the plant is attacked, they are one-chambered, but if buds are attacked they have many chambers which simulate flower and leaf structure. G's usually contain in addition to the larvæ a certain number of insects which cause birds to prey on them. Hemipterous and homopterous insects form galls. Wasps are responsible for oak-apples, from certain kinds of which ink is manufactured. Many different galls, formed by Diptera, are found on willows. Mite-galls, consisting of little tufts of hair and hypertrophied cells, are found on the pear, plum, ash, and alder. They are caused by microscopic Acaridea.

GALL-STONES, lime concretions formed by bile in gall-bladder; brown to white, size from small gravel to goose egg; hot fomentations helpful; sometimes surgical operation necessary.

GALLWITZ, MAX VON (1852), Ger. general, *b.* at Breslau; at outbreak of World War was inspector-general of Prussian field-artillery; fought against Russia under Hindenburg on Narev front; one of Mackensen's commanders in the great attack from the Dunajetz, 1915; and later took over command of an army against Serbia; on Cambrai front, Sept. 1917; in crown prince's army group W. of the Meuse, 1917; at head of army group of Verdun sector, 1918.

GALSWORTHY, JOHN (1867), Eng. novelist and playwright; called to the bar, 1890; spent much of his early manhood in travel; first revealed his characteristic style and method in *The Island Pharisees*, 1904. His novels include *The Man of Property*, 1906; *The Country House*, 1907; *Fraternity*, 1909; *The Patrician*, 1911; *The Dark Flower*, 1913;

A Sheaf, 1916; *Five Tales*, 1918; *Another Sheaf* and *Saint's Progress*, 1919. His plays have been collected and pub. in 3 vols. 1909-13. His *The Skin Game*, 1920, attained great success.

GALT, a city in the province of Ontario, Canada, in Waterloo co. It is on the Grand Trunk and Canadian Pacific railroads, and on both sides of the Grand river, which is spanned by several bridges. The city is an important industrial center and has manufactures of tools, agricultural implements, boilers, engines, stoves, safes, etc. There are several parks, a collegiate institute, and a mechanics' institute. The city is connected by electric railway with neighboring cities. Pop. 1920, 12,434.

GALT, SIR ALEXANDER TILLOCH (1817-93), Canadian statesman; *s.* of John Galt, the novelist; emigrated to Canada, 1835; reorganized Canadian finance and shared in federation of Brit. N. Amer. Provinces.

GALT, JOHN (1779-1839), Scot. novelist; *b.* Irvine; prolific writer of stories dealing with Scot. life and character, of which the best are *The Ayrshire Legatees*, *Annals of the Parish*, *The Entail*, and *Lawrie Todd*.

GALTON, SIR FRANCIS (1822-1911), Eng. anthropologist and eugenist; cousin of Charles Darwin; made explorations in S.W. Africa and other countries; investigated meteorological conditions, being the first to establish the theory of anticyclones; made important researches in anthropology and heredity, employing biometrical and statistical methods, and founded the science of eugenics, endowing a chair in London Univ.; inventor of many scientific methods and instruments, and author of many works on scientific subjects. See his *Memories of my Life*, 1908.

GALVANI, LUIGI (1737-98), Ital. physiologist; lecturer on anatomy at Bologna, 1762; made first investigations of action of electricity on muscles of animals.

GALVANIC BATTERIES. See BATTERY, ELECTRIC.

GALVANIZING is the process of coating iron with zinc. The iron is thoroughly cleaned by immersion in acid and scouring with sand; it is then dipped into molten zinc; sometimes the zinc is deposited electrolytically. The treatment protects the iron from rusting.

GALVANOMETER, an instrument for detecting, or measuring the strength of, an electric current. There are various forms of instruments suitable for different purposes, the chief being the *sine*, *tangent*, *mirror*, *suspended coil*, and *ballistic* g's. The last is used for measuring the *quantity* of electricity that has passed in the case of a current of very short duration, while the mirror g. will detect and measure very weak currents. The construction of all g's depends on the observed fact that an electric current in a wire deflects a neighboring magnetic needle in accordance with a known law.

GALVESTON, a city of Texas, in Galveston co., of which it is the county seat. It is situated on Galveston Island, between Galveston Bay and the Gulf of Mexico, and is on the Gulf, Colorado and Sante Fe, the Missouri, Kansas and Texas, the Great Northern, and other railroads. It also has steamship connection with New York, New Orleans, Liverpool, and nearly all South and Central American and West Indian ports. Galveston is the largest and deepest harbor on the Gulf coast, and has over two miles of docks. The harbor has been greatly improved by the United States government and is made accessible for steamers of the largest tonnage. Following the great flood of 1900, which destroyed a great portion of the city, a great sea wall covering the entire frontage was erected at a cost of two million dollars. Galveston is the second largest city of the State in population and the first in commercial importance. It is well laid out and has many handsome private and public buildings. The latter include a United States government building, county court-house, city hall, supreme court-house, cotton exchanges, Masonic Temple, and several club houses. Galveston is the first city in the United States in the export of cotton and is one of the first five in the total value of exports. Its industries include cotton pressing and milling, and the manufacture of cotton goods, bagging and cordage. It is the seat of several well known educational institutions including University of St. Mary, the Medical School of the University of Texas, Convent of the Sacred Heart, and Rosenberg School. There is an excellent school system, a public library, and several fine parks. The city is equipped with all the conveniences and improvements which make up the most modern community. Galveston was settled in 1837. It was captured by Federal forces in 1862 and was re-taken by the Confederates in the following year. In 1885 it was nearly destroyed by fire and on September 8, 1900, a violent tornado and flood caused the loss of 7,000 lives and the destruction of property to the value of 30 million dollars. From this disaster the city quickly recovered. Pop. 1920, 44,255.

GALWAY (53° 20′ N., 9° W.), second argest county in Ireland; in Connaught; coast-line broken; area, *c.* 2370 sq. miles; includes Lough Corrib and part of Lough Mask; in W. lies famous dis-rict of Connemara—wild and moun-ainous; G. is flat and marshy in E. Chief ivers are Shannon (forming S.E. boun-lary), Black, and Suck. Slieve-Baughta Mts. in S.; Twelve Pins (*c.* 2400 ft.) in W. Valuable fisheries; has seven round owers and many monastic ruins. Pop. 83,000.

GALWAY (53° 17′ N., 9° 3′ W.), sea-port, capital of County Galway, Ireland; eat of Catholic bp.; chief edifices, Episcopal church of St. Nicholas, St. Augustine's Catholic church, Univ. Coll.; has good harbor; salmon fishing; exports agricultural produce, wool, marble; surrendered to Ginkell in 1691. Pop. 3,500.

GAMA, VASCO DA. See Vasco da Gama.

GAMALIEL, a Pharisee mentioned n *Acts*; grandson of Hillel; rabbinical eacher, taught St. Paul; member of Sanhedrim. His grandson, Gamaliel II., was prominent in war against Rome; elped to revive Judaism after fall of Temple; pres. of Sanhedrim, 90-110 A.D. Gamaliel III. was patriarch, 193-220; ompleted his *f.*'s work of drawing up Mishna.

GAMBETTA, LÉON (1838-82), Fr. tatesman; *b.* Cahors; educated Cahors nd Paris. Made his name at the Bar ver defense of Delescluze, 1868. Sat n Assembly, 1869, as a republican. Supported Franco-Prussian War as a atriot, and after Sedan continued a wonderfully inspiring resistance. Chiefly esponsible for securing constitution of Feb. 1875. Author of policy of oppor-unism, opponent of clericalism, and ead of 'Le Grand Ministère', Nov. 1881. Advocated co-operation with Britain in Egypt, but prevented from developing is views by his death.

GAMBIA. (1) British crown colony nd protectorate, W. Africa (13° 3′-3° 46′ N., 13° 55′-16° 47′ W.); consists f a narrow strip of country on both anks of Gambia, from its mouth to Yarbatenda, about 250 miles inland; ountry flat and marshy; climate fairly ealthy; principal town, Bathurst; chief roducts and exports are ground nuts, ndia-rubber, bees-wax, hides, kernels, otton (woven and dyed by natives). Cable communication from Bathurst to t. Vincent and Sierra Leone; no railways; Eng. settlement dates from 16th ent. After being a dependency of ierra Leone and part of W. African settlements, 1866, Gambia was made a separate colony, 1888. Administered by a governor, with executive and nominated legislative council. Area, 4,500 sq. m. (colony, 69 sq. m.); pop. 240,000. (2) Riv., Senegambia, W. Africa; rises in Futa-Jallon, flows generally W., through Gambia to Atlantic at Bathurst; length, 1,000 m.; navigable to Barraconda, some 90 m. above its mouth.

GAMBIER ISLANDS (23° 15′ S., 134° 55′ E.), small archipelago in Pacific, forming part Polynesia; three large and seven small islands; Fr. colony. Area, 10 sq. miles. Pop. 500.

GAMBIER, JAMES GAMBIER, BARON (1756-1833), Brit. admiral; entered navy as midshipman, 1767; post-captain, 1778; rear-admiral and one of Admiralty Lords, 1795; commanded Channel Fleet, 1808-11; further services were diplomatic.

GAMBODGE, Indo-Chinese kingdom, under Fr. protectorate, on banks of Mè-Kong River, capital, Pnom Penh. Pop. 2,000,000.

GAMBRINUS, a mythical Flemish king who is supposed to have commenced the brewing of beer. The exact derivation of his name is not known, but is held to be derived from Gan Primus, who was the president of the Guild of Brewers.

GAME LAWS, legislation for the protection of animals in danger of extinction from the hunter. The protection of game by laws dates back to the time of the Normans in England, who prohibited the common people from hunting or snaring that the nobles might have good hunting. European countries, however, have in recent times done comparatively little to check the killing of game for sport. The United States is in this sense the best protected country in the world. There are in the United States both state and Federal laws tending toward or directly protecting game. Of the latter the Stacey Law, passed in 1900, is a good example. This law, based on the jurisdiction of the Federal Government in interstate commerce, empowers the Secretary of Agriculture to prohibit the transportation into or out of the country, or between one state and another, of any game coming under the state game laws. Another Federal law is that passed in 1911 prohibiting the purchase or sale of aigrettes. The laws of the individual states vary widely, but practically all of them have enacted legislation for the protection of game or fish. Usually hunting or fishing is allowed only during certain periods, or is forbidden during certain periods, usually during the breeding season. As an instance, even while deer hunting is allowed in California, the law forbids the killing of a doe and a spotted fawn. In Connecticut deer became so nearly extinct that deer hunting was entirely prohibited, with the result that at the present time deer are again as abundant as they ever were. All states forbid commercialized hunting. In all the states there are about 10,000 game wardens or authorized game protectors employed.

GAMES.—Athletic games were a marked feature of the lives of the Greeks from very early times, and are described in Homer. The principal g's were foot-racing, wrestling, boxing, and chariot-racing, and in their beginning were closely connected with religion. They were generally held near the shrine of some deity, to whom they were dedicated; but later they were celebrated because of some military victory, or in honor of some great person. The principal g's were the Olympic, the Pythian, the Nemean, and the Isthmian—held at different times and in different places, and dating from many cent's before Christ. Thus the Olympic g's were held at Olympia; the Pythian originally at Delphi; and the Isthmian in the Isthmus of Corinth. The earliest and most celebrated were the Olympic g's, which were abolished by the Christian Emperor, Theodosius, 394 A.D. They were revived in 1896, and are held every four years; thrown open to people of all nations; take place in Berlin, 1916. The Romans adopted the Gk. g's named, and also added others; but they were eventually supplanted by the gladiatorial and wild-beast combats of the later Cæsars.

GAMING, the playing for stakes at games either of chance or of mixed chance and skill. It should be noted that gaming and wagering transactions are void in law, and no action can be brought to recover any money alleged to have been won in such transactions. Generally the effect of the law is that a man cannot be compelled to pay a bet, but cannot recover money when bet has been paid.

GAMMA RAYS. Radio-active substances such as radium and uranium, were found to give off three distinct types of rays. These were named, by Sir Ernest Rutherford, Alpha, Beta and Gamma rays. Alpha rays were later recognized as atoms of helium gas. Beta rays (*q.v.*) were identified as electrons, or particles of negative electricity. Gamma rays are not material particles, but are waves with properties similar
to Roentgen or X-rays, of which t
appear to be a type. They will,
instance, penetrate opaque substan
such as stone, flesh or leather. T
are considered, therefore, a variety
light, having a very short wave-len

GAMUT (*gamma ut*), form of s
used in mediæval music; now applie
the scale or compass of wind instrume

GANDAK, GREAT (25° 45′ N.,
14′ E.), river, India; rises in Ne
Himalayas; joins Ganges near Pa

GANDAK, LITTLE (26° 4′ N.,
4′ E.), river, India; rises in Nepal h
joins Gogra, a tributary of Ganges.

GANDAMAK (34° 18′ N., 70° 2′
village, Afghanistan; scene of mass
of last survivors of Brit. force f
Kabul, 1842.

GANDERSHEIM (51° 52′ N., 10
E.), town, Brunswick, Germany; sea
famous abbey, founded IX. cent.

GANDHARVA, deity in the V
myth.

**GANDHI, MOHANDAS KARA
CHAND** (1869), Indian lawyer
agitator; *b.* Porbandar, India.
grandfather had been Prime Min
of one of the native princes, and o
ancestors had held high office. He
to London in 1888, studied law in
country and returned to India in
In the same year he associated hin
with a law firm in South Africa. T
the prejudice that prevailed ag
Hindus put his life in jeopardy
mob violence. He was insulted, be
and served several terms in jail. Y
the Boer War he was of great assist
to the British authorities in organizin
Indian Ambulance Corps, and co-op
ed with them also in 1906 during
Zulu Rebellion. During the World
he organized the Indian Field A
lance Corps. Following the war how
he inaugurated in India the 'pa
resistance' movement with which
name and fame are associated.
became the leader of this movem
which is regarded by the British a
most menacing in the history of
empire. He urged his countryme
refuse co-operation of any kind with
British Government. They were
refuse to buy British goods. H
lawyers were not to plead before Br
courts. He held that it was not
the right but the duty of Indian
refuse allegiance to the Government
at the same time he cautioned his
lowers that they must take the c
quences of civil disobedience wit
resorting to violence. His slogan
'India for the Indians.' His doct

have taken strong hold on the people of India and by most of them he is revered as a saint. He is an enemy of modern industrialism, would abolish machinery and revert to the economic practices of ancient times. In the course of his crusade, riots have occasionally occurred and violence has been practiced by his followers; but never without the disavowal and condemnation of Gandhi himself. His singularly pure and gentle character, his sincerity and consistency, his ascetic mode of life, together with his marked intellectual ability, have given him tremendous influence over three hundred million people. Because of that influence, the British Government hesitated for a long time before taking drastic measures; but at length Gandhi was brought to trial at Ahmedabad on charge of sedition and sentenced, March 18, 1922, to six years in prison. He thanked the Court for its courtesy and said he considered the sentence as light as any judge could possibly have inflicted.

GANDIA (39° N., 0° 10′ W.), town, Valencia, Spain; coasting trade. Pop. 10,000.

GANDO (11° N., 4° E.), state, W. Sudan, on Niger, N. of Borgu; chief town, Gando (pop. *c.* 12,000), on Sokoto; inhabited by Fulah and Hausa races. Area, *c.* 78,000 sq. miles. Pop. *c.* 5,000,000.

GANESA, Hindu god, patron of prudence; represented with elephant's head.

GANGES (23° N., 90° E.), the sacred river of India; rises in ranges of Himalayas under name of Bhagirathi, and at junction with Alaknanda takes name of Ganges; flows with generally S.E. course and enters Bay of Bengal by one of largest deltas in world; most important channels, Hugli on W., Meghua on E.; length of main stream, about 1500 miles, greater part of which is navigable; chief tributaries, Jumna, Son, Ramgunga, Gunti, Gogra, Gandak, Kusi, Jamuna, and Attri; on its banks are many great cities, including Calcutta, Monghyr, Patna, Benares, Allahabad, Cawnpore.

GANGI, town, Palermo province, Sicily; famous as Enguium, temple of which Cicero accused Verres of having despoiled. Pop. 11,000.

GANGLION, nerve center, oval swelling containing nerve cells. See NERVOUS SYSTEM.

GANGOTRI (31° N., 79° E.), celebrated place of Hindu pilgrimage, in Gharwal, N. India.

GANGPUR (22° 5′ N., 84° E.), native state, Bihar and Orissa, India. Area, 2518 sq. miles. Pop. 239,000.

GANGRENE, mortification of appreciable part of the body; due to devitalization or disease; *dry* or *moist*, latter accompanied by putrefaction, high fever, and blood poisoning.

GANJAM (19° 22′ N., 85° 7′ E.), district, Madras Presidency, Brit. India, extending along Bay of Bengal; mountainous, interspersed with fertile plains and valleys; chief rivers, Rushikulya Vamsadhara, and Languliya; produces grain and rice; capital, Berhampur. Area, 8372 sq. miles. Pop. 2,010,000.

GANKU (1749-1838), Jap. artist; founder of the Kishi school; famous as a painter of tigers.

GANNAT, town, Allier, France, on river Andelot; also district of same name, 66 parishes, pop. 60,000. Pop. (town) 5,600.

GANNETS and **BOOBIES** (*Sulidae*), a family of marine swimming and diving birds with four webbed toes; feed on fish, and nest on rocky cliffs; frequent all the great oceans.

GANNETT, HENRY (1846 - 1914), American geographer. *b.* in Bath, Maine. Graduating from the Lawrence Scientific School in 1869 he was geographer of the U.S. Geological Survey, 1882; geographer of the census 1910, 1911, and 1912, and of the census in Cuba and Porto Rico in 1899. Publications *Manual of Topographical Surveys*, 1893; *Dictionary of Altitudes*, 1899; *Commercial Geography*, *The Building of a Nation*, and *Gazeteers of Texas and Cuba*.

GANNON, JOHN MARK (1877), Rom. Catholic Bishop. *b.* in Pennsylvania. Bachelor of Arts, St. Bonaventure's College, New York in 1899. At Catholic University, Washington, D.C. in 1900 was Bachelor of Sacred Theology. In Rome, Italy, 1903 was Doctor of Civil Laws and Doctor of Divinity at Appolinare University. In 1902 took special studies at University of Munich. At Duquesne University was Doctor of Laws in 1914. In Cambridge Springs, Pennsylvania was pastor of St. Anthony's Church, 1904-1915, also pastor of St. Bridget's Church, Meadville and St. Andrew's Church, Erie. Was vicar general Diocese of Erie. In 1918 was consecrated auxiliary bishop of Erie. 1911-1919 Diocese of Erie, was Superintendent of Catholic education.

GANODONTA, order of mammals having bands of enamel on teeth; possibly related to Edentates (*q.v.*).

GANOIDS, the name given by Agassiz to one of the four orders of fishes. They do not form a natural group, but are characterized by the horny scales, covered with enamel, with which the skin is covered. In prehistoric times, fish belonging to this order were abundant, as shown by the fossil remains found in the Carbonaceous, Permian, Triassic, Jurassic and Cretaceous rocks of Europe and America. They began, however, about the close of Cretaceous time, to diminish in favor of the teleost fishes, which steadily became the predominating type. Ganoids are now comparatively rare, and are, for the most part, fresh-water fish, including the sturgeon, the bow-fin, the gar-pike and some fishes of tropical Africa.

GANYMEDE (classical myth.), a beautiful Trojan boy who was taken to heaven by an eagle and made cup-bearer to Zeus.

GANZ, RUDOLPH (1877), pianist, composer. *b.* in Switzerland. Studied in conservatories of music at Zurich, Strassburg and Lausanne. Studied with Busoni, in Berlin. Studied composition with Urban and Blanchet. At the age of twelve, made his debut in Zurich, Switzerland. In 1900 came to United States. From 1901-05 taught music in Chicago. Has played with leading orchestras in Canada and United States. Was engaged in 1921 as conductor of St. Louis Symphony Orchestra, engagement to end in 1924. Composer of over 200 songs, and symphony concert piece for piano.

GAO, GARO, or **GOGO** (16° 10′ N., 0° 8′ E.), town, on Niger, Fr. W. Africa; ancient capital, Songhai Empire; military post.

GAP (44° 34′ N., 6° 4′ E.), town, ancient *Vapincum*, capital of Hautes-Alpes, France; has fine modern cathedral; silk and woolen manufactures. Pop. 11,000.

GAPAN (15° 24′ N., 120° 57′ E.), town, Luzon, Philippine Islands; rice, tobacco. Pop. 20,000.

GAPES, a parasitic disease which attacks poultry and which, in former times, caused frequent and fatal epidemics as farmers knew of no remedy. Fowls already infected or wild birds drop the ova of the worms on the chicken run. The chickens pick up these ova with their proper food and soon the ova develop into worms (*Sclerostoma syngamus*), which cling by sucker-like mouths to the mucous-membrane of the windpipe. A diseased fowl will yawn and G. for respiration, which is impeded by the parasites and may eventually die of asphyxiation. A mixtu
of turpentine and olive oil poured
intervals down the bird's throat, som
times effects a cure.

GAPON, FATHER (1839-1906), Ru
sian priest and agitator; held very stror
Radical views, and came into prom
nence as leader of strikes in Petrograd
1905; was forced to flee, and on h
return at the end of the year, was d
nounced by the revolutionary papers
an *agent provocateur*; soon after he w
assassinated.

GAR FISHES (*Belonidoe*), long-jawe
long, narrow-bodied, 'bony' fishes; e
ceedingly active and voracious; comm
in warm seas.

GARASHANIN, ILIYA (1812-74), Se
bian soldier and politician; command
of army, 1836; minister of home a
foreign affairs, 1853-67.

GARAT, DOMINIQUE JOSEP
(1749-1833), Fr. politician, lawyer, a
writer; made a senator and count
Napoleon; member of Institute
France, 1803-16.

GARBAGE, DISPOSAL OF. Ga
bage may be divided into two classes
domestic and industrial. These aga
may be subdivided into mineral a
organic, the former consisting of ash
bottles, broken glass, tin cans, and
on, and the latter of paper, rags, wa
from vegetable and animal food a
similar products. In the United Sta
it has become an almost universal cust
to collect furnace ashes and other g
bage in separate receptacles. The c
tom arose from the feeding of wa
food to pigs and cattle on the farms, a
in some urban districts it is still
custom for the farmers to collect t
waste food from householders. Natur
ly, the presence of mineral matter
objectionable in garbage used for su
purposes, and as it is also advantage
for the two types of waste to be k
separate when scientific methods
disposal are employed, it is proba
that the custom will become permanen
established.

In thickly populated districts,
disposal of domestic and industr
waste presents a problem of gr
magnitude. The older method of
posal was to dump it on the land or
bury it, but this is not only unsigh
and unsanitary, but soon becomes
impossibility owing to the scarcity
waste land. Near the coast a comm
practice is to load the garbage i
scows and haul it out to sea where i
dumped. This method is expensive
frequently leads to highly objectiona
pollution of the waters near shore

a fouling of harbors and beaches. Both these practices are to be condemned as unsatisfactory and unhealthy, but civilized countries have been slow to adopt more scientific methods. Great Britain has been the pioneer in such methods and in recent years much has been done in the United States along similar lines, but other European countries have shown but little inclination to follow their lead. Two methods of disposal are now in use. In the first, the garbage is burnt in special furnaces, the heat evolved being used for steam raising purposes, while in the second valuable products are recovered from the garbage, firstly by sorting and secondly by extraction either with steam or solvents. The extraction yields a grease which has various industrial uses. The first garbage incinerator was erected in Great Britain in 1870, and in 1887 the city of Des Moines, Iowa, built the first incinerator in the United States. In 1897, an elaborate refuse destructor and electric lighting plant combined, was opened at Shoreditch near London, England. The plant consisted of twelve furnaces with a daily capacity of 144 tons garbage. The heat from the burning refuse generated 1200 H.P. which was used to drive dynamos for supplying electric light to part of the London suburbs. In San Francisco, a similar plant has a daily capacity of 600 tons refuse. Boston took the lead in the organization of a garbage sorting plant, and both in that city and in New York, combined sorting and incinerating plants are in existence. It is stated that English garbage will burn without the addition of extra fuel, but that American garbage requires extra fuel owing to the fact that it contains a greater proportion of wet vegetable matter. Manufacturers of small domestic incinerators, however, claim that ordinary domestic garbage contains sufficient paper and other dry combustible matter to remove the moisture from the vegetable matter, which will itself then burn, thus avoiding the use of extra fuel. These small incinerators are now installed in a large number of dwellings in this country.

GARBLE, originally to sift; but now to mutilate a book or writing, for the purpose of distorting the author's meaning.

GARCIA, CALIXTO (1836-98), Cuban soldier and patriot; rebelled against Spaniards, 1880; captured and deported to Spain, where imprisoned for fifteen years; on outbreak of last rebellion, 1895, escaped to Cuba, won several victories over Spanish, and in Span.-Amer. War led Cuban force at El Caney, 1898; died while on mission to Washington.

GARCIA MANOEL, DEL POPOLO VINCENTO (1775-1832), famous Span. teacher and composer; celebrated pupils, *daus.*, Marie (Mme. Malibran) and Pauline, and *s.*, Manoel G. (1805-1906), who invented laryngoscope, wrote works on singing and human voice; prof., Royal Academy of Music, 1848-95.

GARCILASO DE LA VEGA, see VEGA.

GARD (44° N., 4° 10′ E.), department, S. France, on Mediterranean; formed of part of ancient Languedoc; surface slopes towards Rhône and Mediterranean with numerous lakes and marshes on coast; chief rivers, Cèze, Gard, Vidroule, and Hérault; rich in coal, iron, lead; large quantities of salt manufactured; olives and chestnuts extensively grown; important vineyards; silkworm rearing; capital, Nimes. Area, 2270 sq. miles. Pop. 1921, 396,169.

GARDA, LAKE OF (45° 40′ N., 10° 40′ E.), lake, N. Italy, between Lombardy and Venetia; receives Sarca at N. end; drained by Mincio at S.E. end into Po; surrounded by beautiful scenery; favorite health-resort

GARDAIA, GHARDEIA, town, S.E. Algeria, occupied by Fr. 1857; caravan center; also district of same name, pop. 15,000, including 1600 Europeans. Pop. (town) 52,000.

GARDANE, CLAUDE MATTHIEU, COUNT (1766-1818), Fr. general; rose rapidly in army, distinguishing himself at Barsiguana, 1799; A.D.C. to Napoleon, 1805; occupied in diplomatic negotiations; attached to army of Masséna in Portugal, 1810; blundered and fell into disfavor.

GARDELEGEN (52° 31′ N., 11° 23′ E.), town, on Mulde, Pruss. Saxony, Germany; agricultural implements manufactured. Pop. 8,000.

GARDEN, MARY (1877), Operatic soprano. *b.* in Aberdeen, Scotland, and came to America at six. At that age she began to study the violin and appeared at concerts when 12. In 1896 she studied voice in Paris under Trabadello, Chevallier and Fugère. Her first operatic appearance was in Carpentier's 'Louise' at the Opera Comique, Paris, on April 13, 1900, when she substituted Mlle. Rioton who had fallen ill, in the third act, and subsequently played the part for 100 nights. After singing in Brussels and London she appeared at Hammerstein's Manhattan Opera House, N. Y. in 'Thais' in 1907, and later sang the parts of Melisande and Salome. She first sang in Chicago in November 1910, and has since been with the Chicago Opera Co. of which she became director in 1921. Among her best roles are 'Marguerite,' 'Griselidis,' 'Thäis' and 'Sappho.'

GARDEN CITY, a village on Long Island, New York, in Nassau co. It is on the Long Island railroad, and is 18 miles east of New York City. It was founded by Alexander T. Stewart, the famous merchant, as a residential town and is the place of residence of many people from New York City. It is the seat of the Protestant Episcopal bishop of Long Island and contains the Cathedral of the Incarnation. Here are also the cathedral schools of St. Mary and St. Paul. The extensive publishing plant of Doubleday, Page & Company is here. Pop. about 5,000.

GARDEN OF THE GODS, a dist. of Colorado, in the vicinity of Colorado Springs. It covers about 500 acres, and is remarkable for its strange and extremely beautiful formations of rock, some of which resemble in form cathedral spires, etc.

GARDENIA, group of rubiaceous plants and trees; white or yellow funneled flowers, 6 to 7 stamens; small berry, yields a yellow dye.

GARDENING. *History.* — Hesiod, Xenophon, and Theophrastus among the Greeks, and Varro, Cato, Pliny, Columella, Virgil, and Horace among the Romans, have left us some account of the horticultural practice of their times. But the monuments of ancient Egypt give plans of irrigated gardens going back sixteen centuries before the Christian era, and the seeds of various cultivated fruits, flowers, and shrubs have been discovered among the anc. Egyptian tombs. We read, too, of famous hanging—(*i.e.*) terraced—gardens at Babylon, and at Passargadæ in Persia. Gardening has also been cultivated from time immemorial in India, and above all in China, where many of the people are very expert in this almost universally loved art. It was the Romans who introduced gardening into Britain; they brought many fruits, pot-herbs, and decorative plants. In the 3rd cent. A.D. the Emperor Probus popularized the cultivation of the vine in these islands. But with the decline of the Roman power, gardening fell into decay, and was only revived by the monks. Medicinal herbs especially were grown in the monastic gardens. Necham's *De Naturis Rerum*, written in the 12th cent., gives a list of the plants then grown in the monastic grounds. Later, gardens were formed around the principal castles, including that of the king. Among the plan grown in the time of Henry II. we pears, apples, nuts, cherries, bean onions, garlic, and numerous medicin herbs. The practice of gardening soo spread among the poorer people; v read in *Piers Plowman* of them growi beans, apples, peas, onions, and cherrie These, with garlic, leeks, kale, swe herbs, medicinal herbs, and vario fruits, were the chief products of th gardens of the period, which we usually enclosed by high walls or hedge Periwinkles, marigolds, roses, and viole were among the favorite flowers, th rose most esteemed being a fragra double red; the 'Madonna lily' was he in high honor.

Arbors, fountains, trim hedges, grass seats, and shady trees gave character these early gardens. The first garde book written in English was a poe called *The Feate of Gardening*, by Jo Gardener, about the middle of the 15t cent. Among the plants named in th book as suitable for a garden are th following: clary, cowslip, foxglove, hav thorn, hollyhock, lavender, mint, parsle sage, spinach, strawberries, apple, thym and rose. In the 15th cent. flower ga dening became more popular, and abou this time the topiary art, which had lon before been practiced by the Roman was introduced to Britain.

In the 17th cent. pleasure-gardenin reached a very high level in Englan Parkinson, in his *Paradisi in Sole Par disum Terrestris*, 1629, gives a descripti list of twelve distinct varieties of friti laries, eight varieties of grape hyacinth twenty-one varieties of primroses an cowslips, and even more of lilies and roses. In his charming essay *Of Garden* Bacon pictures the perfect Elizabetha garden.

Bowling-greens, clipped yews, an sun-dials were all characteristic featur of the gardens of this period. Up t the time of Queen Anne formal gardenin had held the field unchallenged; but Pop and Addison ridiculed the popular idea and soon produced a reaction. Th landscape gardener thus came into bein Bridgeman, Kent, Batty Langley, an 'Capability' Brown were the pioneers the new movement. The gardene tried to 'copy nature'; artificial lake streams, ruins, and circuitous drive leading nowhere, were created roun every mansion, and stately avenues an terraces were abolished in favor of im tation of nature. British gardening to-day, which combines the best fro the modes of the past, is probably at higher level than it has ever befor reached.

Market-gardening is that branch agriculture concerned with the produc tion, for market sale, of fruit, vegetables, and flowers. The growth of market-gardening has been one of the most striking phenomena of the close of the 19th and the first twenty years of the 20th cent. The steady increase in the cultivation of crops under glass is even more pronounced than the general advance. But so long as the railway charges for the carriage of garden produce remain so high, market-gardening can only flourish near large towns. One very important factor of success is the selection of the most suitable crops to grow. Another point of great importance is to study quality as well as quantity of produce. Flower culture is perhaps the branch of market-gardening from which, under suitable conditions, the greatest financial yield can be obtained from a small amount of land. Here, more than anywhere, quality tells; and the intelligent grower who sacrifices cheapness when planting for the sake of choicer flowers, reaps his due reward. Bunching and packing are matters of the greatest importance. Immediately flowers are gathered they should be taken to a cool, not too light shed or underground cellar, and their stems placed in water. Under these conditions they preserve their freshness for a considerable time. Light, heat, and dryness are the chief causes of flowers withering.

GARDENS, BOTANIC. See BOTANIC GARDENS.

GARDIE, MAGNUS GABRIEL, COUNT DE LA (1622-86), Swed. statesman; supreme in court of Christina, and principal member of ill-famed regency of minority of Charles XI.

GARDINER, a city of Maine, in Kennebec co. It is on the Maine Central railroad, and on Kennebec river, 6 miles S.W. of Augusta. The city has excellent water power from the Cobossee river and has important manufacturing industries including saw mills, paper mills, furniture factories, boot and shoe factories, carriage factories, etc. Formerly the ice cutting industry employed a large number of people during the winter but the importance of this has during recent years diminished. Pop. 1920, 5,475.

GARDINER, LION (1599-1663), an early American settler. He bought from the Indians, in 1639, the small island now known as Gardiner's Island. He gave it the name of the Isle of Wight. This island off Long Island is still in the possession of the Gardiner family.

GARDINER, SAMUEL RAWSON (1829-1902), Eng. historian; ed. Winchester and Christ Church, Oxford; Fellow of All Souls, 1884, and Merton, 1892; subsequently prof. of Modern History, King's Coll., London; declined regius professorship of Modern History, Oxford, 1894. Chiefly remembered as historian of Puritan Revolution.

GARDINER, STEPHEN (*c.* 1493-1555), lord chancellor and bp. of Winchester; *b.* at Bury St. Edmunds; became sec. to Cardinal Wolsey, whose embassy to France he accompanied in 1527. On accession of Edward VI., G. was deprived of bishopric and imprisoned in Fleet; was set free by Queen Mary, whom he crowned, and whose lord chancellor he became.

GARDNER, a city of Massachusetts, in Worcester co. It includes the villages of Gardner Center, South Gardner, and West Gardner. It is on the Boston and Maine railroad, 25 miles north of Worcester. The city is the center of a large agricultural region and is also important industrially, having manufactures of rattan goods, gas and oil stoves, foundry and machine shop products. It has the Levi Haywood Memorial Library, a high school, banks, etc. Pop. 1920, 16,971.

GARFIELD, a borough of New Jersey, in Bergen co. It is on the Erie railroad, and on the Passaic river. Its industries are of great importance and include woolen mills, knitting mills, stone works, machine shops and plants for the making of clothing, chemicals, rubber goods, cigars, etc. Pop. 1920, 19,381.

GARFIELD, HARRY AUGUSTUS (1863), American college president. *s.* of James A. Garfield; *b.* at Hiram, Ohio. Graduated from Williams College in 1885 and was a teacher in Concord, New Hampshire 1885-1886. Admitted to the bar of Ohio he practiced law in Cleveland 1888-1903, and was professor of contracts at the Western Reserve Law School 1889-97. Professor of Politics at Princeton University 1903-08 he was called to presidency of Williams College in the last year. Was president of the Cleveland Municipal Association 1896 and of the Chamber of Commerce, 1898-1899. President Wilson appointed him Fuel Commissioner in 1917.

GARFIELD, JAMES ABRAM (1830-81), Twentieth President of the U.S. *b.* at Orange, Ohio. *d.* at Elberon, New Jersey. His early life was full of hardships. Much of it was spent in farm labor. He went to school for three months in winter. For some time he was a driver and steersman on the Ohio canal, reading meanwhile every book that came in his way. Teaching school gave him the means to pursue his education, and in 1856 he graduated from Williams College with high honors. He taught the classics at Hiram Institute, Ohio, 1856-57, and was president 1857-59. While teaching he studied law and was admitted to the bar in 1859 and elected to the Ohio senate. When the Civil War began he was made Lt. Colonel of the 42nd Ohio Infantry. With 11,000 men he defeated 5,000 Confederates under Gen. Marshall in Kentucky in 1862 and Lincoln promoted him brigadier-general. He fought at Shiloh and Corinth, was made chief-of-staff to Rosencrantz and was again promoted a major-general for valor at Chickamauga in September 1863. At Lincoln's request he resigned his commission to take his seat in the 62nd Congress where he immediately became prominent. He was the first chairman of the Committee on Banking and Currency, and was eight times elected to Congress. During the reconstruction period he was strongly opposed to President Johnson's plans. On January 13, 1880 the Ohio Legislature unanimously elected him to the U.S. Senate to succeed Allen G. Thurman (*q.v.*). In the same year he headed the Ohio delegation to the Republican National Convention and nominated John Sherman (*q.v.*). He opposed Grant for third term. On the third ballot Garfield was nominated as a compromise candidate. In the election he obtained 214 electoral votes to the 155 given to his Democratic opponent General Hancock. Early in his administration having opposed the claim of Senators Platt and Conkling that they should control the New York appointments, the senators resigned. They sought re-election and were defeated. On July 2, 1881 Garfield while standing in the Baltimore and Potomac Railroad station was shot by Charles Jules Guiteau (*q.v.*), a disappointed office seeker. After much suffering the President was moved to Elberon, N.J. and died there, Sept. 19, 1881. He is buried at Cleveland, Ohio.

GARFIELD, JAMES RUDOLPH (1865), Ex-Secretary of the Interior. *b.* at Hiram, Ohio. *s.* of James A. Garfield. Graduated from Williams College (A.B.) in 1885 and the Columbia Law School and was admitted to the bar in 1888. Elected to the Ohio senate, 1896-99; member of the U.S. Civil Service Convention, 1902-03; Commissioner of Corporations U.S. Department of Commerce and Labor 1903-07. Secretary of the Interior appointed by Roosevelt, 1907-09, and from the last year practiced law in Cleveland, O.

GARGANO (41° 49′ N., 16° 10′ E. mountainous peninsula (ancient *Ga ganus*), Apulia, S. Italy; culminates Monte Calvo, 3470 ft.

GARGANTUA, see Rabelais.

GARGLE. The original or prop meaning of this word was a throat was but, as commonly used, it indicates wash for both the mouth and throa It is used by working the liquid round th mouth and allowing it to trickle dow the throat, while the air is driven out the lungs to prevent the fluid going th wrong way. G's. may be composed hot or cold water, either plain or flavore such as barley water or orange-flow water. They may also be of glycerin plain or medicated with alum, iro tannin, or carbolic acid.

GARGOYLE, in mediæval arch fantastic carvings of heads and oth objects for conveying rain-water fro roofs.

GARHWAL, or **TEHRI** (31° N., 7 E.), native state, adjoining district G., United Province, Brit. India, Himalayas; capital, Tehri. Area, 41 sq. miles. Pop. 300,000.

GARHWAL, or **GURWAL** (31° N 79° E.), district, United Prov., Br India, on S. slope of Himalayas; who surface mountainous; chief rivers, Ala nanda and other headstreams of Gange capital, Serinagaur. Area, 5629 s miles. Pop. 430,000.

GARIBALDI, GIUSEPPE (1807-8 famous Italian patriot, liberator, a guerrilla-leader, *b.* at Nice. A sailo son, he took to the sea, commanding brig by 1830. At this time (*c.* 1833) became acquainted with Mazzini a the leaders of 'Young Italy,' and w fired with enthusiasm for the Itali national movement. For his share in t outbreak at Genoa, 1834, he was oblig to flee to France. He then sailed to America, first serving the republic Rio Grande do Sul, and then that Uruguay, 1836-48, against the Argent dictator, Rosas. Returning to Euro G. took part in the Sardinian campai and joining the revolutionary gove ment at Rome defended it against French under Oudinot, 1849. Obliged retreat before the Austrian forces, G. w forced to land before reaching Veni and his wife perished from exhaust and exposure in his arms. In 1850 went as an exile to U.S., living fo time in Staten Is. In 1854 he retur and settled in Caprera Is., near Sardi eagerly noting the results of Cavo policy in Italy. He fought for Sardi against Austria in 1859, and protes against the cession of Nice and Sa to Napoleon III. in 1860. After the peace of Villafranca, secretly supported by Sardinia's request, G. organized an expedition against the Two Sicilies, in the hope of bringing about the union of Italy. This is, perhaps, his most famous undertaking. He landed at Marsala with his 'thousand volunteers,' defeating the Neapolitan troops, which far outnumbered his own, at Calatafimi, and thus opening the way to Palermo. G. became dictator of Sicily, and crossing to Italy expelled Francis II. from Naples and entered the city in triumph. When Victor Emmanuel, King of Italy, appeared with his Sardinian troops in the kingdom of Naples, G. delivered up his army to his sovereign and absolute sway over the Neapolitan provinces, retiring to Caprera in 1860. He was severely wounded at Aspromonte, 1862, fighting against the royal troops, and taken prisoner, but pardoned shortly afterwards. On his second attempt to oppose the papal power, 1867, he was utterly defeated by the papal and French troops at Mentana, but allowed to return in confinement to Caprera. In 1870-71 he attempted to help the French republic against the Germans, commanding the French volunteers in Bergundy. He entered the Italian parliament in 1874, finally consenting to accept an annual pension from it. G. wrote the novels *Clelia* and *Cantoni il volontario*, but had little literary talent.

GARLAND, AUGUSTUS HILL (1832-99), American statesman, *b.* near Covington, Tenn. In early life he removed to Arkansas and became a member of the Confederate Congress. In 1867 he was elected to the United States Senate but was not allowed to take his seat. He was governor of Arkansas in 1874 and United States Senator in 1876 and in 1883. In 1885 he was appointed by President Cleveland Attorney-General of the United States.

GARLAND, HAMLIN (1860), Amer. novelist and writer, *b.* at West Salem, Wisconsin. Graduated in a literary course at Cedar Valley Seminary, Osage, Ia., 1881. After working on a farm he taught school in Illinois 1882-1883, and then went to Boston to write, returning west in 1893. His most notable works include *Main Travelled Roads*, 1890; *A Little Norsk*, 1891; *Prairie Folks*, 1892-1908; *Rose of Dutcher's Cooly*, 1895; *U. S. Grant*, 1898; *Captain of the Grey Horse Troop*, 1902; *The Long Trail*, 1907; *Cavanagh, Forest Ranger*, 1909; *A Son of the Middle Border*, 1917, and *A Daughter of the Middle Border*, 1921.

GARLAND, THOMAS JAMES (1866), Protestant-Episcopal Bishop, *b.* in Ireland. In 1891, at St. Bees' College, England, was Bachelor of Arts. At Philadelphia Divinity School in 1903 was Bachelor of Divinity; Doctor of Civil Law, 1912 of Philadelphia Divinity School. Was deacon and priest of the Protestant Episcopal Church. Rector of Trinity Church, Coatesville, Pennsylvania, and All Saints Church, Johnstown, Pennsylvania, St. Paul's Church, Bristol, Pennsylvania from 1900-03. 1903-05 was assistant editor of Church Standard. Was secretary of Diocese of Pennsylvania. In 1911 was consecrated bishop suffragan of Pennsylvania. Was secretary of third Missionary Department.

GARLIC, natural order *Liliaceae*, bulbous perennial plant with long narrow green leaves and an umbel of whitish flowers. Bulb is eaten, especially in Southern Europe, and has strong acrid taste and odor.

GARNET, precious stone, found in mica slate, hornblende, gneiss, and granite; color—red, brown, green, yellow, or black; varieties—pyrope, almandine, and common garnet. Pegu, in Syria, is the chief center of the g. markets. G's were used as beads in ancient Egypt, and by the Greeks and Romans as engraved gems.

GARNET, or **GARNETT, HENRY** (1555-1606), Eng. Jesuit; *b.* Heanor, Derbyshire, and became Jesuit while in Italy, 1575; in 1586 was sent on Eng. mission, which he successfully promoted for eighteen years; came to know of Gunpowder Plot conspiracy under seal confession, according to his own account, and apparently did not attempt to prevent it; found guilty of misprision of treason, and executed.

GARNETT, RICHARD (1789-1850), Eng. philologist; one of founders of Philological Soc.; keeper of printed books at Brit. Museum.

GARNETT, RICHARD (1835-1906), Eng. scholar; *s.* of Richard G. (*q.v.*); keeper of printed books, Brit. Museum, 1890-99; wrote numerous vol's of literary criticism and poetry.

GARNIER, MARIE JOSEPH FRANÇOIS (1839-73), Fr. explorer; *b.* St. Étienne; traveled and killed in Indo-China.

GARNIER - PAGÈS, ÉTIENNE JOSEPH LOUIS (1801-41), Fr. politician; leader of Republican party under Louis Philippe.

GARO HILLS (26° N., 90° E.), mountainous district, Assam, India.

GARONNE, ancient *Garumna* (44° 41'

N., 0° 20′ W.), river, S.W. France; rises in Pyrenees, flows N.N.W., enters Bay of Biscay; length, *c.* 350 miles; navigable to Toulouse; chief affluents, Tarn, Lot, Dordogne, Save, Gers, Baïse.

GAR-PIKES, BONY PIKES (*Lepidosteidae*), long, slender, ganoid fishes with enameled scales, armored head, and skeleton well ossified. There are four or five species found only in the fresh waters of southeastern N. America, Central America, and Cuba. They are extremely voracious and exceedingly destructive to young fishes, and hence are detested by fishermen. The best known is the long-nosed Gar Pike (*Lepidosteus osseus*). There are many fossil representatives of the family.

GARRETT, ALEXANDER CHARLES (1832), Protestant-Episcopal Bishop. *b.* in Ireland. Graduate in 1855 of Trinity College, Dublin University. Doctor of Divinity of Nebraska College. Was deacon, 1856 and priest, 1857 of Protestant Episcopal Church. From 1856-59 was curate of East Worldham, Hampshire, England. Was missionary in British Columbia from 1856-1859. Was rector from 1870-1872 of St. James' Church, San Francisco, California. From 1872-74 was dean of Trinity Cathedral, Omaha, Nebraska. Was elected missionary bishop of Northern Texas and in 1874 was consecrated. Remained bishop when Diocese of Dallas was created.

GARRETT, GARET (1878), Amer. journalist. *b.* in Pana, Illinois. Was educated in the public schools. From 1903-05 was financial writer for the New York Sun. Wrote for the New York Times from 1906-07; The Wall Street Journal, 1907-08; The Evening Post, 1909-12. From 1912-14 he was editor of New York Times Annalist. From 1916-19 on New York Tribune as assistant editor. Author of *Where the Money Grows*, 1911; *An Empire Beleaguered*, 1916; *The Blue Wound*, 1920; *The Driver*, 1921; *The Mad Dollar*, 1921. Has written economic and political essays.

GARRETT, JOHN WORK (1872), Diplomat. *b.* in Baltimore, Maryland. Bachelor of Science of Princeton in 1895. Since 1896 was partner in the firm of Robert Garrett and Sons, Baltimore. 1901-03 secretary to the American Legation at The Hague. 1903-05 secretary to Luxemburg and the Netherlands. 1905-08 second secretary American Embassy at Berlin. At Rome, 1908-11 first secretary to the American Embassy. At The Hague, 1903-04 was secretary of the Arbitral Tribunal in Venezuelan preferential treatment case. Member of Council on Foreign Relations, American Geographic Society, American Academy of Political and Social Science and American Society of International Law.

GARRETT, JOÃO BAPTISTA DA SILVA LEITÃO DE ALMEIDA (1799-1854), Portug. poet; wrote hist. and poetic dramas and lyrics of high merit; did much political and administrative work.

GARRICK, DAVID (1717-79), Eng. actor and dramatist; *b.* Hereford; *s.* of an army captain; ed. at Litchfield, where he met Samuel Johnson; accompanied the latter to London; set up in business as wine merchant, but to no purpose; turned actor, and achieved immediate success as Richard III., 1741. He later played at Covent Garden and Drury Lane Theatres, becoming, with Lacy, joint-proprietor of the latter house in 1747. He disposed of his share in the theatre for $175,000 in 1766, and retired from the stage. He died three years later and was buried in Westminster Abbey. G., who was below middle height, had a face of great mobility, and possessed wonderful powers of mimicry. He was probably the most versatile actor ever seen on the Eng. stage, and his range included all the leading Shakespearean parts, both tragic and comic, besides numerous character studies in his own plays and many of the older dramatists. His lasting vogue was due to the naturalness of his acting; and his vivacious style, in place of the stilted, declamatory manner of his predecessors, gave new life to Shakespeare as a stage dramatist.

GARRISON, JAMES HARVEY (1842), American editor. *b.* in Missouri. Was student at Ozark High School. In 1861 enlisted in Union Army as private. Served until 1865. Had various promotions finally being made Major. Was Doctor of Laws of Bethany College. From 1869-1912 was editor of Christian Evangelist. Since 1912 editor emeritus. Author of *Heavenward Way*, 1880; *The Old Faith Restated*, 1891; *Alone with God*, 1891; *Half Hour Studies at the Cross*, 1895; *Our First Congress*, 1900; *Modern Plea for Ancient Truths*, 1902; *Helps to Faith*, 1903; *Place of Religion in the Life of Man*, 1918. Wrote *Editor's Easy Chair* for the *Christian Evangelist*.

GARRISON, LINDLEY MILLER (1864), *b.* in Camden, New Jersey; educated at the Episcopal Academy, Philadelphia and the Phillips Exeter Academy, Mass. and was at Harvard one year (LL.D. N.Y. University, 1914, Rutgers 1915, and Brown 1917). He studied law in Philadelphia and joined the bar there in 1886, and New Jersey bar, 1888; practiced in Camden, N.J. until 1898. Vice-chancellor of New Jersey 1904-13: Secretary of War in Wilson's cabinet 1913-16 when he resigned to become a partner in the law firm of Hornblower, Miller, and Garrison, New York City.

GARRISON, MABEL (Mrs. George Siemonn), operatic soprano. *b.* in Baltimore, Maryland, a graduate of the Peabody Conservatory of Music, Baltimore. She first attracted attention as a choir singer and made her first appearance in opera in the role of Filina in 'Mignon' at the Boston Opera House. April 19, 1912. She became member of the Metropolitan Opera Company in 1914 and is also a favorite concert singer.

GARRISON, WILLIAM LLOYD (1805-79), American abolitionist; *b.* Newburyport, Mass. He was chiefly self-educated, and in the intervals of manual labor began to write articles for newspapers. He became editor of the Newburyport Herald in 1824 and of the National Philanthropist, a temperance journal, in 1827. Two years later in conjunction with a Mr. Lundy, a Quaker, he founded at Baltimore a paper called the Genius of Universal Emancipation. From that time on he engaged enthusiastically in the anti-slavery movement. He founded the Liberator in 1831, and through its columns labored incessantly for negro emancipation. He established the American Anti-Slavery Society in 1832. He was threatened with assassination; was many times subjected to mob violence; a reward of $5,000 was offered by the legislature of Georgia to anyone who should capture him and bring him to trial and conviction in that State; repeated appeals were made to the mayor of Boston to repress his paper. Still he persisted until his efforts were crowned with success. His visits to England in furtherance of his anti-slavery plans made him an international as well as a national figure. In 1865, when slavery had been overthrown by the outcome of the Civil War, the friends of Garrison presented him with a purse of $30,000 in recognition of his efforts.

GARROTTE, Span. method of strangling criminals by means of a metal collar, fixed to an upright post, and a screw which enters the spinal column.—Garrotting, system of partial strangulation, used by highway robbers in England, who seized their victims from behind.

GARRUCHA (37° 10′ N., 1° 52′ W.), seaport, on Mediterranean, Almeria, Spain; exports silver, copper, iron, fruit. Pop. 5,000.

GARSTON (53° 22′ N., 2° 54′ W.), town and port, on Mersey, Lancashire, England. Pop. 17,000.

GARTER, ORDER OF THE, see KNIGHTHOOD.

GARTER SNAKE. See SNAKES AND SERPENTS.

GARTH, SIR SAMUEL (1661-1719); Eng. physician, author of satirical and moral poems and of several translations.

GARTOK (31° 44′ N., 80° 23′ E.), town, W. Tibet; trading center.

GARVAN, FRANCIS PATRICK (1875), lawyer. *b.* in Connecticut. In 1897 Bachelor of Arts of Yale University. At New York Law School Bachelor of Laws in 1899. Began practicing in 1898 in New York. From 1900-1910 was Assistant district attorney. 1917-19 was manager of New York Office of alien property custodian, and Director of Bureau of Investigation, United States. In March 1919 was appointed alien property custodian. Was assistant attorney General of United States. Was Dean of Fordham Law School. Trustee of Catholic University. Member of Bar Association of City of New York.

GARVIN, JAMES LOUIS (1868), Brit. journalist and publicist; was leader writer on *Newcastle Chronicle*, 1891-9, ed. of *Outlook*, 1905 and of *Pall Mall Gazette*, 1912-15, also of *Observer* since 1908; author of *Economic Foundations of Peace*, 1919, a strong plea for the League of Nations.

GARY, a city of Indiana, in Lake co. It is on the Indiana, Baltimore and Ohio, Chicago, Indiana and Southern, the Elgin, Joliet and Eastern, and other railroads. Gary is at the head of Lake Michigan and is midway between the great iron ore beds of the North and the coal regions of the South. This led to its selection as the site for the main plant of the United States Steel Corporation in April, 1906. From the time of its founding the city has developed rapidly and is now the greatest steel producing city in the world. It contains the plant of the American Bridge Works, Indiana Steel Company, tin plate works, locomotive works, coke by-product works, etc. It has an excellent school system and experiments in education carried on here have given the name to the Gary system of school work. There are many public buildings, a city hall, public library, hospital, and several parks. Pop. 1920, 56,378.

GARY, ELBERT HENRY (1846), Amer. financier. *b.* in Wheaton, Ill. Graduated from Law School of Chicago University in 1867; county judge two terms; became council for railroads and corporations. A leader in organizing great industries. Gave up law in 1898 to be president of the Federal Steel Co., merged into the U.S. Steel Corporation. Gary, Indiana which the steel company built, is named after him. He was a member of the U.S. section of the International High Commission, and resigned in 1917.

GARY SCHOOL SYSTEM, a method of instruction in the schools which takes its name from the city of Gary, Ill., in which it was first originated. The fundamental principle is the provision for a study, work and play school, all within the same building, and so adjusted that the entire capacity of the school rooms, workshops, playgrounds, etc. are occupied in succession by several classes. In general, there are no fixed courses or text books, each child being allowed to choose such studies of work as he prefers. Schools are not divided into elementary and high schools but are all in the same building and using the same rooms, shops and apparatus. The system spread rapidly and has been adopted in some form in most of the largest cities of the country.

GAS is a state of matter which differs from a liquid and solid in that there is no cohesion or attractive force between its molecules at ordinary temperatures and pressures. The most characteristic property of a gas is its power of diffusion. If the concentration of the gas is greater at one point than at another, then the gas moves from the region of higher to the region of lower concentration until by this diffusion the concentration is everywhere the same. Diffusion is independent of the presence of another gas, although the rate of diffusion is less rapid the greater the concentration of the other gas. Both gases, however, distribute themselves equally over the whole space at their disposal. Gases can be liquified if they are cooled to a certain temperature (*critical temperature*). Above this temperature no pressure, however great, will liquefy them. The *critical pressure* is the minimum pressure which will condense the gas to a liquid at the critical temperature. Every known gas has now been obtained as a liquid simply by cooling it.

Very simple laws regulate the behavior of gases. Boyle's law states that at any given temperature the volume of a gas varies inversely as the pressure upon it. Gay-Lussac's law is that for any given pressure the volume of a gas varies directly as the absolute temperature. From these two laws it is deduced that if the volume of a gas remains constant the pressure of any given volume varies directly as the absolute temperature. The amount of work done upon or by a gas when it changes its volume under external pressure is equal to the product of the pressure into the change of volume. Avogadro's hypothesis states that equal volumes of different gases under the same conditions of temperature and pressure contain the same number of molecules.

This hypothesis and the three laws mentioned above are supposed to be explained by the kinetic theory of gases enunciated by Clausius and Maxwell. The molecules of a gas are supposed by it to be independent of one another and to move briskly in all directions in straight lines. The particles may hit each other and the walls of the vessel containing them; but as both they and the walls behave like perfectly elastic bodies there is no loss of their energy of motion in such collisions, their directions and relative velocities only being changed by the impact. This explains the slowing of the diffusion rate when two gases are mixed.

The gas laws do not apply without correction to vapors near the point of condensation or to gases under very great pressure. The explanation of this is that the gas molecules themselves occupy a considerable amount of space when the gas is confined in a small space, and that therefore their range of movement is limited. The gram molecular weight of a gas is the weight of it which will occupy the same volume as 2 grammes of hydrogen measured under the same conditions of temperature and pressure. The volume which the gram molecular weight occupies is called the gram molecular volume. Practically the same for all gases, at 0° and 76 cm. pressure equals 22.38 litres.

Gas or *Coal Gas*, the illuminating agent, was discovered in 1792 and manufactured in 1802. It is manufactured by the destructive distillation of coal in special retorts under special temperature conditions; the higher the temperature of distillation, more gas, but of an inferior illuminating power, is produced. Since the introduction of the incandescent gas mantle, rendering gas of high candle power unnecessary, the coal is heated to the neighborhood of 1000° C., giving a coal gas containing approximately 50 per cent. hydrogen, 35 per cent. methane, 5 per cent. ethylene, 6 per cent. carbon monoxide, etc. The small amount of illuminating power it possesses is due to the 5 per cent. of ethylene. Owing to the presence of the carbon monoxide it is poisonous.

GAS, ASPHYXIATING. See ASPHYXIATING GAS.

GAS, COAL. See Coal Gas.

GAS ENGINES are prime movers which convert into mechanical energy the energy manifested as heat when the combustion of a gaseous fuel takes place in the cylinder of the engine. These engines fall into the general class known as 'internal combustion engines' and are distinct from the 'hot air,' and like engines, in that the combustion of the fuel takes place in the cylinder of the engine.

The Abbe d'Hautefeuille, in 1678, and Christian Huygens, in 1680, conceived, independently, the first internal combustion engine. They utilized the energy of the explosion of a small charge of gunpowder in the cylinder. This engine was, of course, impractical, and was eclipsed by the inventions of John Barber, an Englishman, and Lebon, a Frenchman, who, in 1791 and 1799, proposed engines using a mixture of hydrocarbon gas and air, and 'coal gas and air.'

A very interesting engine and the most practical one thus far developed was constructed in 1860 by Lenoir, a Frenchman. In appearance this engine resembled a single cylinder, horizontal double acting steam engine. A mixture of gas and air was admitted to the cylinder during the first half of the stroke. The admission valve was then closed and an electric spark from a Ruhmkorff coil produced in the cylinder, which ignited (or exploded) the combustible mixture of gases, the piston proceeding owing to the expansion of the products of combustion. The entire return stroke served to expel the burnt gases, while in the opposite end of the cylinder, the admission-power stroke occurred. There was no compression in this engine and consequently it was not very efficient. M. Beaudé realized the cause of this poor efficiency, and in 1862 patented an engine in which the gases were compressed before exploding. No engines were built on this principle however, and it remained for Otto and Langen to rejuvenate the idea in 1867-8 and construct some quite successful models. These engines operated on the four (phase) cycle principle, which was considered at this time to be a disadvantage and several engineers, among them, Dugald-Clerk, made strenuous efforts to perfect a two (phase) cycle engine. In regions where natural gas abounds, and in the neighborhood of Blast Furnaces, where by-product gas is available for fuel, the gas engine is the logical prime mover, and has come into quite extensive use. The modern gas producer, using low grade coal is also commercially used as a source of fuel for this type engine. Several small vessels have been built recently, driven by gas engines, which receive their fuel from gas producers carried on the boat.

GAS FURNACES are used for a variety of industrial operations where precision and exact control are required. The high cost of gas as compared with coal or coke is offset to a large extent by a saving in labor, and by improvement in the product due to uniformity of results, cleanliness, convenience and reliability. A great many different types of furnaces are constructed, but they may be divided into two main classes—reduction or oven furnaces and oxidizing or muffle furnaces. In the former type the products of combustion enter the furnace chamber, while in the latter, the furnace consists of a fire-clay chamber, the outside of which is heated by the burning gases. Gas furnaces are widely used in different branches of the metallurgical industries. Special furnaces for hardening steel and annealing other metals are made with a traveling carrier which passes continuously through the furnace, carrying with it the metal under treatment. The carrier consists of an endless chain, the links forming small cast iron trucks, holding fire clay slabs. The iron trucks travel below the furnace, so that only the fire-clay slabs are subjected to high temperature. Many gas furnaces are used in the United States mints for annealing gold and silver, a rotary cylindrical type being common. Steel tubes and shafts are annealed, and tools, chain links, pens, nuts, bolts, screws and springs are hardened and tempered in gas furnaces, various modifications of endless chains or rotary conveyors being used to render the work continuous. Gas furnaces or ovens are also used for soldering, brazing, assaying and japanning. In all these furnaces a blast burner, or series of burners, is used, in which air, under pressure inducts the gas which is thus injected into the combustion chamber mixed with the proper proportion of air to insure correct burning.

GAS MANTELS. See Welsbach Lights.

GAS MASKS. See Asphyxiating Gas.

GAS METER, an apparatus for measuring and recording the consumption of gas. There are many different types but all of them operate on the same general principles. The meter is divided into two parts, each part being subdivided into two chambers. Between each of the two sets of chambers is a movable diaphragm. The pressure of the gas entering one chamber forces the diaphragm towards the other chamber, so that one chamber expands while the other contracts. At the same time the movement of the diaphragm controls a lever connected with a slide valve. When one chamber is fully expanded, the slide valve cuts off the gas from it and diverts the flow to the other chamber, thus causing the diaphragm to reverse its motion and move in the opposite direction. There is, therefore, a continual backwards and forwards movement of the diaphragm, which is recorded through a system of levers connected with a clockwork device. On the dials of the 'clocks' are shown the number of cubic feet of gas that have passed through the meter. Two of the diaphragms are used in order to supply a steady flow of gas, the valves of the mechanism being so arranged that the reversal of the diaphragm movement occurs at different times in the two divisions of the meter.

GAS SHELLS. See AMMUNITION.

GAS STOVE. See HEATING AND VENTILATING.

GAS, WAR. See CHEMICAL WARFARE.

GASCOIGNE, GEORGE (*c.* 1535-77), Eng. poet; *s.* of Sir John G.; associated with Leicester in entertainment of Elizabeth at Kenilworth; original works include *A Hundred Sundry Flowers*, 1572; *The Glasse of Government*, 1575; *The Steele Glass*, 1576—one of the earliest Eng. satires,—*Instructions Concerning the Making of Verse or Rhyme in England*, etc.

GASCOIGNE, SIR WILLIAM (*d.* 1419), Eng. chief justice; reputed to have committed Henry V. (when Prince of Wales) to prison.

GASCONY, old province of S.W. France; called after ancient Span. tribe Vascones; under counts of Aquitaine, XI. cent.; joined to France, 1137; passed to England, 1154-1451, through marriage of Duke William X.'s daughter to Henry of Anjou, afterwards Henry II. of England; inhabitants notorious for boastfulness.

GASKELL, MRS. ELIZABETH CLEGHORN, *nee* Stevenson (1810-65), English novelist. Her first long story, *Mary Barton* was pub. anonymously in 1848, and met with instant success. It was followed at intervals by her other stories, *Lizzie Leigh*, *Cranford*, *Ruth*, *North and South*, *Sylvia's Lovers*, *Wives and Daughters*, etc.

GASOLINE, a volatile liquid obtained from petroleum or natural gas. Strictly speaking, gasoline is that fraction occurring between petroleum ether and the heavier naphthas, or kerosene, but it frequently contains considerable proportions of the lighter fractions, known as cymogene, rhigolene and petroleum ether, and, especially during recent years, of the heavier fractions known as heavy naphthas. It is obtained by distillation of crude oil, or by extraction from natural gas, or by 'cracking' the heavier fractions of petroleum. The cracking process consists of decomposing the oils by heat, under pressure. Chemically, gasoline consists of a mixture of hydrocarbons, hexane, C_6H_{14}, being the largest constituent. Most commercial gasolines boil between 90° and 220° F. and have a specific gravity ranging between 0.635 and 0.750, but there is a constant tendency to raise the boiling point and the specific gravity in order to include a greater proportion of the heavier fractions and so increase the supply to meet the enormous demand for motor fuel. Extended tests made by the U.S. Bureau of Standards in the summer of 1922 indicated that there was no loss of power or mileage when the heavier grade of gasoline was used. Apparently the chief disadvantage is a greater difficulty in starting the engine and this is noticeable only during the colder months. It is claimed by unofficial observers that once the engine is hot the heavier fractions give steadier and greater power, and that provided the gasoline contains a sufficient proportion of the more volatile fractions to insure a quick start, the heavier grades are actually preferable. This point, however remains in doubt. In addition to its use as a motor fuel, gasoline finds extended application as a solvent, in dry cleaning, in the manufacture of rubber solutions, and in the preparation of certain grades of paint.

GASOLINE CARS. See AUTOMOBILE.

GASOLINE ENGINE, a prime mover of the 'internal combustion engine' type which converts the heat liberated by the combustion of gasoline vapor into mechanical energy. The construction of the engine is similar to that of all internal combustion engines, (*i.e.*) it consists of a cylinder in which the combustion takes place and the expanding gases act on a piston. This is attached, through a connecting rod, to a crank on the crank (or main) shaft on which is mounted a flywheel. Suitable valves with actuating mechanism, together with means for igniting the charge, are provided. A necessary accessory to this engine is a carburetor which vaporizes the liquid gasoline and mixes it with the proper volume of air. These engines operate on either the two (phase) cycle or the four (phase) cycle. The charge is ignited by either the 'jump spark' or the 'Make and break' system. Owing to their ease of starting and because the fuel is in a convenient concentrated form, this type engine is used in practically all automobiles, tractors and aeroplanes; they are also widely used to furnish small amounts of power in rural districts and isolated locations. Their use in the marine field is limited to small power boats, where the two (phase) cycle predominates.

GASPÉ, peninsula in E. part of Quebec prov., Canada (48° 11′-49° 15′ N., 64° 9′-66° 47′ W.), between the St. Lawrence on N. and Bay of Chaleurs on S. Its fisheries are richest in America. Area 8,000 sq. m.; pop. about 55,000 mostly fishermen.

GASQUET, FRANCIS AIDAN (1846), R.C. historian; *b.* at London; abbot of the Eng. Benedictines; raised to the Cardinalate, 1914; author of *Henry VIII. and the English Monasteries,* 1888-9; *Life of Pope Gregory the Great,* 1904; *The Greater Abbeys of England,* 1908, and many other works.

GASSENDI, or **GASSEND, PIERRE** (1592-1655), Fr. philosopher; *b.* Champtercier, Provence; prof. of Math's, Univ. of Paris; G. was in the front rank of the scientists of his time. He held that the primal elements are atoms, generated and set in motion by God; from them everything else is formed by generation and destruction.

GASTEIN (47° 8′ N., 13° 8′ E.), Alpine valley, duchy Salzburg, Austria; picturesque scenery; contains several villages; Wildbad-Gastein has hot mineral springs; favorite resort of Emperor William I. of Prussia; Hof-Gastein is the capital; salt mines.

GASTEROPODA, the name given to one of the three large classes into which molluscs are divided and, as the name indicates, all its genera are characterized by the ventral position of the feet. Gasteropods are subdivided into Isopleura, symmetrical, and Anisopleura, unsymmetrical forms. The former contain the simplest and most primitive molluscs, such as *Chiton*; they are elongated in form, the mouth being at one end, and the anus at the other end of the body, the pedal and visceral nerve-cords run parallel to one another the whole length of the body; and the gills, kidneys, genital ducts, and circulatory organs are bilaterally symmetrical; *Neomenia* and *Pronemeonia* are small flat forms whose shell consists only of minute plates and spines in the skin; *Chaetoderma* are more elongated and cylindrical, but their shells are also rudimentary; *Chiton* has eight dorsal shell plates, fitted, one behind the other. In the Anisopleura the head and foot are bilateral, but the visceral nerve-cord is twisted, bringing the gills, kidneys, and anus, to the right side; the reproductive organ and genital duct are single. The free-swimming forms known as Heteropods sometimes acquire a superficial symmetry. The Streptoneura, or loop-nerved Anisopleura, include *Patella,* the limpet, *Littorina,* the whelk, *Purpura,* the dog-whelk, etc.; the Euthyneura, or straight-nerved, include the Opisthobranchs, *Aplysia, Bulla, Doris, Colis,* etc., and the Pulmonata, *Helix,* the snail, *Arion,* the black slug, etc. Gasteropods are voracious animals, being furnished with powerful rasping organs which enable them to prey on other marine molluscs, while the terrestrial forms, such as snails, work havoc among flowering plants and vegetables; many of them, whelks, etc., are used for human consumption and as bait. Fossil gasteropods occur in the Cambrian rocks, and many modern types have their origin in Cretaceous times.

GASTONIA, a city of North Carolina, in Gaston co., of which it is the county seat. It is on the Southern, the Piedmont and Northern, and the Carolina and Northwestern railroads. It is important industrially and has plants for the making of cotton mill machines, cement, wood fiber, etc. Pop. 1920, 12,871.

GASTRIC JUICE, a colorless acid fluid, secreted by certain cells in the stomach, containing enzymes and hydrochloric acid in addition to small amounts of organic and inorganic materials. The principal enzyme, or ferment, present, is pepsin, which is derived from a precursor, propepsin. The latter, on coming into contact with acid, is converted into the ferment which acts upon the protein of the food. Pepsin, therefore, can only act in acid solution, and both the ferment itself and the hydrochloric acid of the G.J. are secreted by special cells in the stomach. The amount of the secretion, and also its composition, are determined by the nature of the food. Pepsin acts on protein matter, converting it into soluble forms, albumoses and peptones, which are passed on to the intestine, there to undergo further change. It is possible that another ferment, rennin, is also present in G.J.; this is, however, doubtful, as the clotting of milk may be due to the pepsin.

GASTRIC ULCER, disease occurring more often in women than men, especially in anæmic, under-fed, and overworked people, usually on the posterior surface of the stomach, due to the action of the digestive juices on a portion of the stomach wall, the nutrition of which is impaired, (*e.g.*) by a clot blocking the blood-vessel supplying the wall. The symptoms are often somewhat indefinite, resembling dyspepsia, and vary with the site of the ulcer; but there is usually severe pain, tenderness below the ribs, and vomiting soon after food is swallowed, which relieves the pain. Vomiting of blood is also common.

GASTRITIS, inflammation of the stomach, is usually due to irritation from food (*e.g.* tinned meats) which has begun to decompose, unripe fruit; or it may occur after diphtheria, typhoid, and other fevers. There is headache, sickness, severe pain, and tenderness over the abdomen, and often vomiting of blood-streaked food.

GASTROSTOMY. This consists in making a mouth to the stomach, and is an operation performed in order to prevent the food passing through the throat and gullet.

GASTROTOMY. This literally means cutting the stomach, and is a term incorrectly applied to laparotomy (cutting the abdomen), meaning an operation inside the abdomen.

GATACRE, SIR WILLIAM FORBES (1843-1906), Brit. general; saw active service in the Hazara expedition on the N.W. frontier of India, 1888, Burmese campaign, 1889-90, Chitral, 1895. Two years later he went to the Sudan, and commanded Brit. brigade at battles of Atbara and Omdurman. In S. African War, 1899-1900, he commanded 3rd Infantry Division.

GATCHINA (59° 32′ N., 30° 3′ E.), town, summer resort, Russia; contains one of imperial residences. Pop. 14,500.

GATE, Teutonic word meaning a passage or entrance (*cf.* Cowgate, Canongate, streets in Edinburgh). In fortifications it was surmounted by a crenellated gatehouse for the warden and flanked by towers, while a moat ran in front, only to be crossed by the drawbridge. It is an imposing architectural feature in Renaissance work, (*e.g.*) Wren's Middle Temple Gateway.

GATEHOUSE, building over the outer gate in mediæval and later castellated buildings and mansions. They were often of considerable size and strength. Town gates often had g's attached.

GATES, CALEB FRANK (1857), college president. *b.* in Chicago. In 1877, Bachelor of Arts of Beloit College. In 1881 graduated from Chicago Theological Seminary. Doctor of Divinity in 1897 of Knox College. In 1899 at Edinburgh University was Doctor of Laws. Was ordained Congregational Minister in 1881. Was member of American Board of Commissioners for Foreign Missions at Mardin, Turkey in Asia from 1881-94. From 1894-1902 president of Euphrates College, Harpoot, Turkey. From 1903 president of Robert College, Constantinople. From 1917-19 Chairman of Near East Relief Commission in Constantinople. Author of *A Christian Business Man.* 1893.

GATES, ELEANOR (Mrs. Frederick Ferdinand Moore) (1875), author; *b.* in Minnesota. 1894-1895 studied at Stanford University. Was on staffs of several California papers including Call, Examiner and Chronicle. Held one of the eight scholarships founded by Mrs. Phoebe Hearst. Member of Pacific Coast Woman's Press Association. Author of *The Biography of a Prairie Girl*, 1902; *The Plow-Woman*, 1906; *Good Night*, 1907; *Cupid, the Cow-Punch*, 1907; *The Justice of Gideon*, 1910; *The Poor Little Rich Girl*, 1913. The play, *We Are Seven* in 1913; *Apron-Strings*, 1917; *Phoebe*, 1918; *Piggie*, 1919; *The Rich Little Poor Boy*, 1921.

GATES, HORATIO (1722-1806), American military officer. *b.* at Malden, Essex, England. *d.* in New York, Joining the army while a youth he was sent to Halifax in 1755, and was later with the Braddock Expedition. Congress appointed him adjutant-general in 1775, commander of the northern army in 1776 and of the Northern Dept. in the next year. He defeated Burgoyne at Saratoga, October 7, 1777, and was president of the new board of Ordnance the same year. Aided by friends he tried to supplant Washington in 1778 and for which he was so discredited that he resigned. In 1780 he again joined the army. After his troops were defeated near Camden, he was suspended from duty, but was reinstated in command in 1782.

GATES, MERRILL EDWARDS (1848), educator, lecturer, and author, *b.* in Warsaw, New York. Graduated from the University of Rochester, A.B. Ph.D. University of the State of New York; LL.D. Principal of Albany Boys Academy 1870-1882; President of Rutgers, 1882-90 and of Amherst 1890-1909; Member since 1884, chairman 1890, secretary 1899-1912, of the U.S. Board of Indian Commissioners; preacher in the Congregational church since 1899; President American Missions Association, 1892-1908, and of the Lake Mohonk Indian Conference for 8 years. Author *Sydney Lanier*, 1887; *International Arbi-*

tration, 1897; *The Higher Use of Wealth*, 1901; *Introduction to the Pocket Edition of the Constitution of the United States*, 1920.

GATESHEAD (54° 58′ N., 1° 36′ W.), town, Durham, England, on Tyne, opposite Newcastle, with which it is connected by several bridges; chief edifices, town hall, library, parish church, hospitals; locomotive depot; extensive ironworks; glass and chemical works; grindstone quarries. Pop. 1921, 124,514.

GATH (31° 41′ N., 34° 54′ E.), one of five chief cities of Philistines.

GATLING GUN. In 1861 Richard Jordan Gatling invented the first practical machine gun, which bears his name. It was of the multiple barrel type, having a series of parallel barrels (usually ten) arranged in a circle around a shaft parallel to them. Each barrel had its own lock, breach, etc. The whole series of barrels was arranged to revolve around their common shaft, the loading mechanism being arranged to feed the shells one at a time into a grooved carrier, which revolved with the barrels. A suitable mechanism was employed to press the shells home into the breeches. The gun was operated by two men, one turned a crank, which, through a gear, rotated the set of barrels around its axis, the cartridges being fired by a mechanical arrangement when the gun barrel reached a certain point in its revolution. After firing, the cartridge was mechanically ejected and the barrel loaded and made ready for firing by the time it had reached its firing position. The gun differed from all previous models in principle and design, it also could be fired more rapidly and used heavier projectiles than its predecessors. Its maximum firing speed was about 20 rounds per minute. The arm is now practically obsolete, having been replaced by the automatic and semi-automatic machine gun.

GATLING, RICHARD JORDAN (1818-1903), American inventor *b.* in Hartford County, North Carolina. *d.* in New York. Began to invent machines as a boy and in 1844 built a rice-sower which he later adapted to sow wheat in drills, in 1850 invented a hemp breaker. The revolving battery that was named after him was invented in 1861. A dozen of these were used by General Butler on the James River, and in 1865 were adopted by the U.S. government. It was also adopted by European nations. Mr. Gatling was arranging to place a motor-plow on the market when he died.

GATTI-GASAZZA, GIULIO (1869), director of opera. *b.* at Udine, Italy. Graduated as a naval engineer from the Polytechnic College, Geneva, Italy. Director the Municipal Theatre, Ferrara, 1892-1908; of the Scala, Milan, 1898-1908. In the latter year he became director of the Metropolitan Opera Company, New York City. Director of Institute of Musical Art, New York City. Married Frances Alda, soprano, in 1910.

GATTY, MRS. ALFRED SCOTT (1809-73), Eng. writer for children; pub. *Parables from Nature*, *Aunt Judy* books.

GAUCHOS, Hispano-Amer. inhabitants of the pampas of Argentina. They have a strain of Indian blood. Their skill with the lasso is extraordinary. Few genuine gauchos now remain.

GAUDEN, JOHN (1605-62), Eng. bp. and author; vicar of Chippenham, 1630; rural dean of Bocking, 1641; bp. of Exeter, 1660; of Worcester, 1662; claimed to have written *Eikon Basilike*, originally pub. as work of Charles I.; authorship still doubtful.

GAUGES, PRESSURE, instruments which indicate or measure the pressure of fluids (either liquids or gases). They are of three types: (1) The liquid column or manometer type, used for accurate scientific measurement; in this the pressure is indicated by the height to which it will force a column and liquid of known specific gravity, in a tube. Light oils, water or mercury are used, depending upon the pressure to be measured. (2) The Bourdon Spring type, the most practical and extensively used gauge. This consists of a thin metal tube of elliptical section, bent into the arc of a circle. One end is sealed, and attached through links to a pointer which indicates the pressure on a scale, the other connects with the container in which the pressure is to be measured. When the pressure inside the tube is greater than that of the atmosphere surrounding it, the tube tends to change its cross-section to a circular one, this effects a straightening of the tube, thus changing the position of the pointer and registering an increased pressure. (3) That type which depends for its indication on the compression of a spring when acted upon by a piston upon which the pressure manifests itself.

GAUHATI (26° 11′ N., 91° 48′ E.), town, Assam, India, on Brahmaputra. Pop. 11,500.

GAUL, GALLIA, territory occupied by Gallic tribes (*Celti*, *Belgae*, *Aquitani*, etc.); in ancient times consisted of—(1) Gallia Cisalpina, (*i.e.*) N. Italy between Alps and Apennines; (2) Gallia Transalpina, modern France and Belgium, part of Germany and Switzerland. Cisalpine Gaul was conquered by Romans, *c.* 220 B.C., and afterwards joined to Italy. Transalpine Gaul was then invaded and ultimately subdued by Julius Cæsar in famous Gallic Wars, 58-50 B.C.; adopted Rom. civilization and prospered (see Provence); chief town, Lyons (*q.v.*); divided into provinces—*Narbonnensis*, *Aquitania*, *Lugdunensis*, *Belgica*; overrun by Franks, Vandals, Visigoths, and other barbarians, *c.* 400 A.D. See France.

GAULT, GOLT, GALT, marls and calcareous slates occurring between the lower and upper greensands of chalky formations, and belonging to the lower Cretaceous system; color—light grey and dark blue; found at Folkestone and in Cambridgeshire. G. is also name for any kind of stiff blue clay.

GAUNTLET, a steel or leather glove; to 'run the gauntlet' was an old punishment by which persons were compelled to pass between a double line of their fellows, who struck at them with knotted ropes.

GAUR, LAKHNAUTI (24° 52′ N., 88° 10′ E.), ruined city, near Ganges, Bengal, India; said to have been founded XII. cent.; capital of Mohammedan viceroys and kings of Bengal from XIII. cent.; fell into decay after Mogul conquest, 1575.

GAUSS, CHRISTIAN (1878), University Professor. *b.* in Michigan. In 1898 Bachelor of Arts of University of Michigan and in 1899 Master of Arts. From 1899-1901 was instructor at University of Michigan of Romance Languages. Assistant professor of modern languages at Lehigh University from 1901-03. 1905-07 professor of modern languages. Graduate lecturer from 1915-16 of New York University. Lecturer on Arts and Sciences at Columbia University. President of Dante League of America, 1918-20. Author of *The German Emperor*, 1915; *Through College on Nothing a Year*, 1915; *Why We Went to War*, 1918.

GAUSS, KARL FRIEDRICH (1777-1855), Ger. mathematician and physicist; app. director Göttingen astronomical observatory, 1807, where with Weber he built a magnetic observatory, 1833; invented magnetometer, declination needle; made trigonometrical survey of Hanover.

GAUSSEN, FRANÇOIS SAMUEL ROBERT LOUIS (1790-1863), Swiss Prot. theologian; in trouble with ecclesiastical authorities at Geneva; formed *Societe Evangelique*.

GAUTAMA (*c.* 560-480 B.C.), Prince Siddhartha ('the enlightened one'), founder of Buddhism; son of chief of Aryan tribe of Sakyas, whose cap., Kapila-vastu, was *c.* 100 m. N.E. of Benares; received name of Gautama as child. Miraculous circumstances attended his conception and birth; many legends of his wisdom and prowess in childhood and youth; in twenty-ninth year saw visions which led him to devote himself to religion and philosophy; after birth of son parted from sleeping wife and babe, renounced wealth and power, and became homeless wanderer, practicing rigorous asceticism for six years; resolving to return to more genial life, was deserted by his five disciples; underwent fierce temptation from demon of wickedness; sat for six weeks plunged in abstraction, revolving the causes of things; under the Bodhidruma ('tree of intelligence,' Bo Tree) attained perfect wisdom of the Buddha; preached first at Benares; made many converts during forty years of missionary work; died at Kusinagara (Oudh) at age of eighty; body burned; relics distributed among number of contending claimants, and *topes* erected to preserve them.

GAUTIER, THÉOPHILE (1811-72), Fr. poet and prose writer; disciple of Victor Hugo and Romantic school; began his career as poet with *Albertus*, 1830; which was followed by the *Comedie de la Mort*, 1832, but his best poetical work is contained in *Emaux et Camees*, 1856. He achieved success with his realistic novel, *Mademoiselle de Maupin*, 1835, and other works of fiction include *Le Capitaine Fracasse*, *La Belle Jenny*, *Militona*, etc. He was also a prolific writer of travel books, criticism and feuilletons, and was one of the greatest Fr. masters of the short story.

GAUZE, a light transparent fabric, used for dress purposes. The name is thought to have been derived from the fact that Gaza, in Palestine, was the place of its origin. The warp threads of the material are crossed between each thread of the weft, which passes through a succession of loops in the warp. Thus the threads are kept apart, with no tendency to slide, and the transparent character of the fabric is maintained. Other materials have this gauze-like quality, such as muslin, etc. The manufacture is most extensively carried on in France and Switzerland.

GAVARNI, pseudonym of Sulpice Chevalier, 1804-66, a noted Fr. caricaturist and book illustrator; took subjects from low life.

GAVELKIND, general usage in Eng. before the Conquest, by which if a man *d.* intestate his lands passed equally to all his sons, or, failing direct issue, to his bro's. The custom still survives in Kent.

GAVESTON, PIERS (*d.* 1312), Earl of Cornwall; favorite of Edward II.; executed by jealous barons.

GAVOTTE, dance somewhat resembling the minuet, which flourished in 17th and 18th cents. Music consists of air in which there are two strains, each of four or eight bars, in $\frac{2}{4}$ or $\frac{4}{4}$ time.

GAWAIN, knight in Arthurian legend; *s.* of Loth, king of Orkney, and nephew to Arthur. Gawain was originally regarded as model of courtesy and gallantry. Malory and later writers make him base and immoral.

GAWLER (34° 35′ S., 138° 39′ E.), town, S. Australia; foundries, flour-mills. Pop. 11,000.

GAY, JOHN (1685-1732), Eng. poet, dramatist, and fabulist; his most successful works were his *Fables*, 1727 and *The Beggar's Opera*, 1728—a Newgate pastoral. Other writings include *Rural Sports, Trivia, The Shepherd's Week*, also some plays and miscellaneous poems; lyrical gift shown in *Black-Eyed Susan* and other undying songs; helpless, lazy, easy-going nature; very popular in XVIII. cent.

GAY, MARIE FRANÇOISE SOPHIE (1776-1852), Fr. novelist (Directoire and Empire periods), playwright, song-writer and musician; mother of Delphine G., Madame de Girardin.

GAY, WALTER (1856), American painter, *b.* in Hingham, Mass. A nephew of S. H. Gay (*q.v.*). He went to Europe in 1876 and studied under Bonnat in Paris, becoming a regular contributor to the Salon. Notable among his paintings are *Bendicite*, Amiens Museum, France; *Cigarette Sellers* in the Luxembourg, and *Spinners* in the Metropolitan, New York. Others are in the Museum of Art, Boston, and public galleries in Chicago, Pittsburgh and Tate Gallery, London. He is a commander of the Legion of Honor. In more recent years he has mostly painted interiors without figures, *Palazzo Barbaro Interior* is in the Boston Museum; *The Medallions* in the Luxembourg and *Interior of the Petit Trianon* at the Providence School of Design.

GAYA (24° 48′ N., 85° 3′ E.), district, Patna, Bihar and Orissa, India; consists of level and fertile plain; chief river, Son; abounds with holy places; capital Gaya (pop. 68,000), where Buddha, under a pepal tree, is supposed to have attained all knowledge; center of pilgrimage; silk and cotton manufactures. Area, 4712 sq. miles. Pop. 2,060,000.

GAYARRE, CHARLES ARTHUR, (1805-95), an American historian and public official, *b.* in Louisiana. From 1846 to 1853 he was Secretary of State of Louisiana, and for many years was presiding judge of the city of New Orleans. He wrote several historical works, including *History of Louisiana*, and *Louisiana: Its History as a French Colony.*

GAY-LUSSAC, JOSEPH LOUIS (1778-1850), Fr. physicist; prof. of physics at the Sorbonne, and of chem. at the Jardin des Plantes; was a rival of Davy, whose researches on iodine, chlorine, sodium, and potassium he tried to prove inaccurate. He investigated properties of gases, hygrometry, capillarity, and stated the law of volumes, and improved the processes for the manufacture of sulphuric and oxalic acids. Quantitative analysis and organic analysis were benefited by the accurate methods he introduced into such problems as the assay of silver.

GAYNOR, WILLIAM JAY (1848-1913), American jurist and public official. *b.* in Whitestone, Oneida County, New York; *d.* at sea. Educated at Whitestone Academy. Taught school in Boston for a time and moved to Brooklyn in 1873 where he wrote for the newspapers. In 1875 he was admitted to the bar. He gained a reputation as a political reformer and was appointed to the Supreme Court of New York in 1893. Constantly warring against political corruption he was the means of convicting John Y. McKane a 'Boss' of Coney Island, and was elected mayor of New York for term 1910-13. Aug. 9, 1910 he was shot by a discharged employee while about to take passage to Europe. From the effects of the wound inflicted he never quite recovered. In 1913 he headed an Independent Ticket for mayor, but before the election he died at sea on his way to Europe.

GAZA, town, Palestine (31° 31′ N., 34° 28′ W.); commercial center; was most southerly and important of five royal cities of Philistines; captured by Alexander the Great, 333 B.C., and by Kléber 1799; trades in wheat, barley, wool. Pop. 15,000. Captured by Lord Allenby Nov. 7, 1917 after General Murray's forces had twice failed to take it (March and April 1917).

GAZA, THEODORUS (*c.* 1398-1478), Gk. scholar; one of the pioneers of the revival of Gk. learning; author of a Gk. grammar and other works.

GAZALAND (24° 30′ S., 34° 20′ E.), district, S.E. part of Port. E. Africa.

GAZELLE (*Gazella*), antelope genus, of African, Arabian, and Indian deserts; distinguished by lyrate horns, sandy color, with light and dark face markings. Waller's G. (*Lithocranius walleri*), or gerenuk, an E. African g., has hooked, massive horns in male and peculiar skull structure.

GAZETTE, a newspaper; the *London Gazette*, pub. twice weekly, is the Government organ for official announcements and appointments.

GAZETTEER. In modern English, this term signifies an alphabetical arrangement of place-names, in other words, a geographical and topographical dictionary containing more or less abundant information, comprising statistics, descriptions, and historical details. In the 18th century, the word was used in the sense of a writer in the gazettes or newspapers (Fr. *gazetier*), and in 1703 the *Gazetteer's or Newsman's Interpreter* was published by Lawrence Echard, followed in 1704 by a second part, called *The Gazetteer*. Although expressed by a new word, the idea was of ancient date, and considerable fragments of the 6th cent. geographical dictionary of Stephanus Byzantius remain to this day. Echard's method was soon adopted by other compilers, viz. Bryce, who published his *Grand Gazetteer* in 1759; and Crutwell, with his *Universal Gazetteer* in 1808. More modern works have now superseded these, including: Longman's (*Times*), Blackie, Chambers, Lippincot.

GEARING, the general term used for the means of transmitting rotary motion, covering such power and motion transmitting devices as the belt, rope, chain and friction drives as well as toothed wheels. General usage, however, has limited the term to toothed and worm wheels. These fall into the following classes: *Spur Wheels*, wheels whose peripheries consist of a series of projections or teeth. The axes of the teeth are parallel to the wheel axis, the shape and size of the teeth are such as to permit their meshing with similar gears. Spur gears are used to transmit power between shafts which are parallel but not coincident. *Bevel Gears* have teeth cut on the surface of a cone, whose axis is the axis of the gear. The shape of the teeth are similar to those of spur gears. They are used to transmit power between shafts whose axes are not parallel but which intersect. *Helical Gears* resemble spur gears, but the axes of the teeth form part of a helix. Used in the same manner as spur gears, they are stronger and more rugged. *Worm Gears* consist of a worm meshing with a special toothed wheel, and are used to transmit power between shafts whose axes are not parallel, and do not intersect.

GEARS. See AUTOMOBILE.

GEARY, JOHN WHITE (1819-73), an American soldier and public official, *b.* in Westmoreland county, Pa. He served as an engineer officer in the Mexican War and was the first postmaster of San Francisco under the American government. In 1856 he became governor of the Kansas Territory, but resigned in the following year. He served in the Civil War and rose to the rank of major-general. He was elected governor of Pennsylvania in 1866 and was re-elected in 1869.

GEBER (X. cent.), reputed author of certain Lat. and Arabic writings on alchemy, etc. The works themselves are of considerable hist. value, but opinion differs regarding their authorship and date.

GEBHARD TRUCHSESS VON WALDBURG (1547-1601), abp. of Cologne; elector of Cologne, 1577; embraced reformed faith, 1582, and *m.*; deposed and excommunicated, 1583.

GEBWEILER (47° 55′ N., 7° 11′ E.), town, Alsace-Lorraine, Germany; textiles; wines. Pop. 12,000.

GECKO, the name given to all lizards belonging to the family Geckotidæ of the order Lacertilia; they are small in size, dull in color, and the soft skin is covered with granular tubercles. Most of them have adhesive digits, which enable them to run along smooth, horizontal or vertical surfaces with astonishing rapidity. G's. are found in nearly all hot climates, and in Egypt and India frequently enter houses; their name indicates the sound emitted by certain species. *Phyllodactylus* is the most widely distributed genus: *P. mauritaricus* being found in S. Europe; the individuals of *Ptychozoon* are remarkable for the web-like expansions which serve them as parachutes.

GEDDES, RT. HON. SIR AUCKLAND CAMPBELL (1879), Brit. politician and diplomat; *b.* Edinburgh; served in South African War as lieutenant, 3rd H.L.I., also in World War, 1914-16; director of recruiting, War Office, 1916-17; M.P. for Basingstoke 1917-20; between 1917 and 1919 held the offices of minister of national service, president of Local Government Board, and minister of reconstruction; president of Board of Trade, May 1919, until his appointment in March, 1920 as ambassador to U.S.

GEDDES, RT. HON. SIR ERIC CAMPBELL (1875), Brit. politician; *b.* Edinburgh; engaged in lumbering, etc., in southern states of America; subsequently managed Baltimore and Ohio Ry. and Rohilkhand and Kumaon Ry., India; director-general of munitions supply, 1915-16; director-general of military rys. and inspector-general of transportation, 1916-17; first lord of the Admiralty, 1917-18; member of war cabinet; minister without portfolio, 1919.

GEDDES, JENNY (XVII. cent.), Scot. historical character; caused riot by throwing stool at Bishop Lindsay's head in St. Giles', Edinburgh, July 23, 1637, on introduction of Laud's Prayer Book.

GEDYMIN (*fl.* early XIV. cent.), grand-duke of Lithuania; *s.* of Lutuwer; ruler over large portion of Russia; warred against Teutonic and Livonian knights; was first to open up Russia to Western culture; founded dynasty and largely increased dominions; killed at siege of Wielowa, 1342.

GEELONG (38° 10′ S., 144° 21′ E.), seaport, Victoria, Australia; first woolen mill in colony established at G.; has extensive wool trade, flour-mills, and tanneries. Pop. 1921, 36,170.

GEESTEMÜNDE (53° 31′ N., 8° 34′ E.), fortified town, Hanover, Germany; principal port of Ger. deep-sea fisheries. Pop. 25,000.

GEFFROY, MATHIEU AUGUSTE (1820-95), Fr. historian; *b.* Paris; pub. *Histoire des etats scandinaves*, 1851, and other hist. studies.

GEFLE (60° 38′ N., 17° 10′ E.), seaport, Sweden, on inlet of Gulf of Bothnia; manufactures textiles, machinery, and tobacco; timber, wood-pulp, iron, and steel exported. Pop. 1921, 37,746.

GEGENBAUR, CARL (1826-1903), Ger. anatomist; prof. of Anatomy at Jena, 1855, and Heidelberg, 1873; made important investigations in comparative anatomy; author of many scientific works.

GEHENNA (Heb. *Ge Hinnom*, valley of Hinnom), Heb. name for Hell. Hinnom, near Jerusalem, being the place where Israel sacrificed children to Moloch, came to be held in horror, and was used later for tipping refuse.

GEIKIE, SIR ARCHIBALD (1835), Scot. geologist; *b.* Edinburgh; director, Geological Survey for Scotland, 1867; prof. of geol., Edinburgh Univ. 1871; director-general of Geological Survey of U.K. 1881-1901; was president of Royal Soc. 1908-13. Among his many publications are *The Ancient Volcanoes of Great Britain, The Founders of Geology, Types of Scenery and their Influence on Literature, Scottish Reminiscences, The Birds of Shakespeare.*

GEISHA, Jap. female singer and dancer.

GEISLINGEN (48° 37′ N., 9° 50′ E.), town, Württemberg, Germany; glass and iron works. Pop. 8,500.

GEISSLER, HEINRICH (1814-79), a German physicist, *b.* at Igelshieb in Saxe-Meiningen. He settled at Bonn, 1854, as a glass-blower, and constructed physical and chemical apparatus. In conjunction with Julius Plücker, in 1852, he discovered the maximum density of water to exist at 38° C. He invented the sealed glass G. tube, a vaporimeter, areometer, mercury air-pump, and normal thermometer.

GELA (37° 10′ N., 14° 20′ E.), ancient city, Sicily; founded by Cretans and Rhodians, 688 B.C.

GELASIUS I., pope 492-96; banished Manichæans. Gelasius II., pope, 1118-19; expelled from Rome by Emperor Henry V., whom he afterwards excommunicated.

GELATI, monastery in Transcaucasia, founded by David, king of Georgia, 1109.

GELATINE, nitrogenous substance obtained by digestion of bones, skin, and tendons with superheated steam. The cooled hot-water solution jellies, but after prolonged heating does not. With potassium bichromate it forms, when exposed to the light, an insoluble compound used in the carbon processes in photography. Bacteria are grown on gelatine cultures.

GELATIN PROCESS, the photographic process which replaced the old wet-plate process, and which consists in the use of a plate or film prepared by coating a sheet of glass or celluloid with a sensitized film of gelatin emulsion. The exact methods by which the various grades of gelatin emulsions are prepared are kept as carefully guarded secrets by the different manufacturers, but the basis on which all the processes depend may be outlined as follows. The gelatin is soaked in water containing a small quantity of potassium bromide. A solution of silver nitrate is then prepared by dissolving in water, and adding ammonia in excess, so that the precipitate first formed is dissolved. The two solutions are then heated to a temperature of 35° C, and when the gelatin is perfectly liquid, the silver salt is added, gradually, with constant stirring. The emulsion is kept at the above temperature for 30 to 40 minutes, and is then poured out and allowed to set. The jelly is next thoroughly washed to remove excess silver, and is then ready for coating the plates. Various mechanical arrangements are used for obtaining an even coat, after which the plates are dried. The operations must, of course, be carried out in ruby light. The process depends upon the fact that bromides react with silver salts, producing insoluble silver bromide, which is sensitive to light. The various 'speeds' of film are obtained by controlling the fineness of grain of the precipitate, and by various secret processes.

GELDERLAND (52° 5′ N., 6° E.), province, Netherlands, S.E. of Zuider Zee; surface more hilly than most of Dutch provinces; traversed by Waal, Rhine, Yssel, Maas; soil very fertile along river banks. Chief crops—cereals, flax, tobacco; cattle-rearing, brick-making, paper and cotton industries carried on; capital, Arnheim. Area, 1965 sq. miles. Pop. 1920, 727,636.

Old Countship of G. was raised to a Duchy, 1338, under the Empire; thrived in commerce; seized by Maximilian of Austria, 1483; absorbed in Hapsburg Netherlands, 1543; north (present Dutch province) seceded, south adhered to Spain, 1579; divided between Holland and Prussia, 1814.

GELDERN (51° 31′ N., 6° 19′ E.), town, Germany, Pruss. Rhine province; formerly residence of Dukes of Gelderland. Pop. 6,000.

GELLERT, faithful hound of the Welsh prince, Llewellyn, who slew him, thinking he had killed the child he had actually saved from a wolf.

GELLERT, CHRISTIAN FÜRCHTEGOTT (1715-69), Ger. religious poet, fabulist, and dramatist; prof. of Philosophy, Leipzig, 1751.

GELLIUS, AULUS (II. cent. A.D.), Rom. grammarian, and author of *Noctes Atticoe*, a miscellany valuable for its extracts from ancient writings no longer extant.

GELLIVARA (67° 20′ N., 20° 50′ E.), town, Sweden; extensive iron-ore mines.

GELNHAUSEN (50° 13′ N., 9° 6′ E.), town, on Kinzig, Hesse-Nassau, Germany; rubber goods; wine. Pop. 4,500.

GELSEMIUM, drug consisting of the dried root of a plant, *Gelsemium nitidum*, of natural order *Loganiaceoe*, growing chiefly in the southeastern United States, its chief constituents being two alkaloids, *gelseminine* and *gelsemine*. Its action has been shown to be mainly on the anterior horns of the spinal cord grey matter, but owing to its uncertain action it is not much used now, except sometimes, in combination with other drugs, for neuralgia or migraine.

GELSENKIRCHEN (51° 32′ N., 7° 14′ E.), town, Westphalia, Prussia; collieries. Pop. 1919, 168,557.

GEM (Lat. *gemma*, 'precious stone'), term applied to certain rare minerals, valued for ornamental purposes, or to precious stones cut, polished, and engraved, which, when the engraving is sunk in the stone, are called *seals* or *signets*, and when engraving is raised, *cameos*.

The ancients had great belief in the medicinal powers of gems, and even at present day some people put faith in 'lucky stones.' The ancients, owing to the absence of chemical analysis, were only able to distinguish the different precious stones by color and density. The diamond, ruby, and sapphire were not much used, as their hardness prevented their being successfully engraved. Varieties of chalcedony quartz were more often employed, and the following were known: carnelian, sard, onyx and sardonyx, agate, plasma, jasper, garnet, hyacinth, emerald, beryl, chrysoberyl, topaz, chrysolite, opal, sapphire, tourmaline, amethyst and turquoise.

The engravers of those times suited the color of the stones to the subject of their engraving (*e.g.*) beryl was used for marine pictures, green jasper for woodland scenes, etc. The range of subjects was wide, and included animals, battle scenes, portraits, fancy designs, mottoes, etc. Inscriptions varied—names of deities, the name of the engraver, a motto, a piece of poetry, or some words indicative of the virtue of the individual gem.

Artificial gem, a precious stone formed by chemical means. The term should not be confused with 'artificial precious stones,' as an artificial gem is actually a real precious stone, which is chemically, physically, and optically identical with a natural gem, though produced by artificial means. Diamonds have been produced from carbon in molten iron under great pressures, and rubies and sapphires from fusion of barium fluoride with alumina and traces of potassium bichromate or cobalt oxide.

The term artificial gem may also be applied to cameos and intaglios, which are spurious imitations of some original and valued engraving.

The engraving of gems is of very anc. origin, and some of the early cameos are valued highly by collectors. This led to their being imitated and copied at the close of the 18th cent. by unscrupulous persons who found collectors only too willing to pay for imitations of valuable gems not in their collections. In modern times, too, a considerable trade is done in this line, and also in the manufacture of gems for ornamental purposes.

Paste copies of existing gems are obtained by making a mould from the original. This is covered with small pieces of glass and placed in a furnace, and the temperature raised to such a heat that the glass melts and fills the mould.

GEMBLOUX (50° 33′ N., 4° 42′ E.), town, Namur, Belgium; has extensive railway and engine works and is railway junction; scene of defeat of Dutch by John of Austria, 1578. Pop. 5,000.

GEMINI, a zodiacal constellation.

GEMMATION. See REPRODUCTION; GERMINATION.

GEMMI PASS (46° 25′ N., 7° 37′ E.), Alpine pass, connecting Swiss cantons Bern and Valais.

GENDARMERIE, name now given to the Fr. military police, but in mediæval times applied to select Fr. cavalry, organized by Charles VII.

GENDER, a distinction made in grammar between words to indicate a difference of sex in the objects denoted by these words. As a general rule in the English language this grammatical distinction agrees with the natural distinction known as sex. Thus names denoting the male sex are masculine G., those denoting the female sex feminine G., and those denoting inanimate objects are neuter G., that is, neither masculine nor feminine. These are cases of natural G., that is to say, the sex and G. agree. This rule is departed from, however, sometimes when inanimate things are personified, as when a ship or engine is made feminine, and the sun and time are made masculine. These are cases of grammatical G., sex and G. being different. In Old English and also in Latin, German, and Greek, this grammatical G. is much more common, many inanimate objects being either masculine or feminine G., while in modern French and other romance languages the neuter G. does not exist.

GENEALOGY, a systematical account of origin, descent, and relations of families; a pedigree; founded on idea of a lineage or family. Ancient g's often supply information respecting tribal subdivision and interrelation. Study of g. is an aid to hist. science, but most old g's require interpretation and criticism of a close nature. Biblical g's, for instance, besides their complexity, often contain manifest improbabilities and inconsistencies. Similarly many g's of ancient Gk. and Rom. families are untrustworthy. Owing their origin often to a desire to trace divine descent, or to prove continuity of race, they are in some cases pure fabrication. Then again, the frequent resort to well-recognized practice of adoption amongst the ancients was an almost insuperable barrier to possibility of a correct g. Study of g. grew in importance in Middle Ages, when nobility was distinct from other classes and monopolized certain offices, eligibility for which depended largely on descent.

In modern times, importance of g. is largely due to laws of inheritance, and desire to assert privileges of a hereditary aristocracy. Private g's are a comparatively late development of the art of pedigree-making. Historically, g's came into prominence in England during time of Edward III.'s claim to Fr. crown, and during rivalry between Yorkists and Lancastrians. From XVI. cent. onwards g's are numerous. Work of genealogist is not always free from taint of inaccuracy and forgery, but is now largely in hands of antiquaries, whose researches are of enormous value to historian. Of late the study has made rapid strides, more material having been made available by publication of parish registers, marriage-license allegations, monumental inscriptions, etc.

GENERAL, a title denoting rank and authority, usually military, but having minor applications. In the United States, Congress established the rank for Washington to indicate its superiority to the rank of major-general. The office was abolished in 1802, but revived in 1866 for General Grant. Since that time it has been conferred on Sherman (1869), Sheridan (1888), and Pershing (1917). The next highest grades, in the order given, are lieutenant-general, major-general and brigadier-general. In the French army, the classifications are brigade-generals and division-generals. The German and Russian armies add to the title of general the name of the branch of the service in which they command as 'of artillery,' of infantry,' 'of cavalry.'

The title is applied also to the head of various orders and congregations in the Roman Catholic Church, as for instance, the Jesuits. A third use of the term indicates chief authority in certain civil and departmental services, as postmaster-general and attorney-general.

GENERAL EDUCATION BOARD, an incorporated organization formed in 1902 by John D. Rockefeller under authority of Congress as a medium through which he could contribute gifts to the cause of education. The funds given by him up to 1921 amounted to $126,788,094, and were voluntarily donated outright without conditions, their disposal for educational purposes being left to the Board. No distinction is made as to sex, race, class or creed in the appropriations made. The Board makes contributions to universities and colleges subject to additional sums being contributed by others. The gifts take the form of endowments and once made pass entirely from the control of the Board. The purpose of the fund also embraces provision for agricultural and medical schools and the spread of negro education. In 1922 the Board aided more than 200 institutions by grants. In that year $8,221,900 was appropriated, $1,160,000 of which was for medical schools and departments; $5,141,223 to colleges and universities for teachers' salaries; $936,725 for negro education; $267,289 for secondary or rural education in the Southern States; and $477,363 for the equipment and other expenses of Lincoln School. Of the amount appropriated to universities, Colorado received $700,000, Johns Hopkins $300,000, and Cincinnati $105,000.

GENERAL PARALYSIS. See INSANITY.

GENERAL STAFF, organization created in conformity with an act of Congress, 1903, the chief of which, under his immediate superior, the Secretary of War, is charged with the duty of preparing plans for military defense, assuring the efficiency and preparedness of the army and directing military operations in time of war. The staff is composed of military officers of various branches of the service detailed for duty in the organization for a period of four years unless previously relieved. Upon the completion of their terms, the officers return to the arm of the service in which they hold permanent commissions, and are not again eligible for service on the staff until two years have elapsed.

The duties of the staff are all-embracing. They relate to organization, distribution, equipment and training; transportation, maneuvers, communications, quarters and supplies. With regard to offensive and defensive operations, they include the study of possible theaters of war and the preparation of strategic plans; the mobilization and assignment of military forces; the collection of military information bearing on the strength, discipline, weapons and equipment of foreign armies; and any other duties that may be from time to time prescribed by the President through the Secretary of War. Officers of the staff are assigned to duties with commanders of armies, divisions and brigades, and when thus assigned serve under the immediate orders of such commanders. Those not so assigned constitute the main body of the War Department General Staff. Except by special authority of the War Department, general staff officers are not assigned to other than general staff duties.

GENERAL THEOLOGICAL SEMINARY. It was established in 1817 by the Protestant Episcopal Church of the United States first in New York City, 1819, then New Haven, 1820, and then again in New York, 1822. Dean Hoffmann gave the institution over $1,000,000 and the productive funds of the Seminary are now over $2,000,000. The study course is three years and there is a postgraduate course. Degrees of D.D. and B.D. are given. The control is in the hands of a board of trustees. The attendance is about 150.

GENERATION. See REPRODUCTIVE SYSTEM.

GENERATIONS, ALTERNATION OF, the occurrence of different kinds of individuals in successive generations, as in butterflies which have seasonal forms, or more usually the occurrence of different kinds of individuals differently produced, in a single life-history, (*e.g.*) where a sexual generation is succeeded by a vegetative generation which reproduces by budding, as in many Cœlenterates, Worms, and Tunicates.

GENERATORS, the name commonly applied to machines for transforming mechanical energy into electrical energy, as distinct from those producing electric currents by means of chemical action as cells, batteries, etc. There are two distinct types of generators, Direct Current and Alternating Current. These may be further subdivided according to the method of winding and internal connections; thus:

Direct Current—1, shunt wound; 2, series wound; 3, compound wound; 4, interpole.

Alternating Current—1, single phase; 2, polyphase (a) two phase, 3 wire and 4 wire; (b) three phase, 3 wire and 4 wire.

Machines of more than three phases are not in common use although they are possible.

For detailed description of the various types see DYNAMO, DIRECT CURRENT GENERATOR, ETC.

GENERATORS, DIRECT CURRENT. See DIRECT CURRENT GENERATORS.

GENERIC IMAGE, OR RECEPT, an image of the common visible characters of a class, (*e.g.*) of cow or horse, but vague in details. Sometimes compared to a 'composite photograph.'

GENESIS, first book of Old Testament; name is of Gk. derivation, signifying the origin of generation of the world. G. forms introduction to history of Israel; naturally divided into two portions, of which the first (chaps. 1-11) gives account of early history of man, beginning with Creation and describing the Fall, the increase of sin, and the Deluge; the second (chaps. 12-50) gives history of the patriarchs, beginnings of the twelve tribes, the sojourn in Egypt, and death of Joseph. G. is said to be the oldest complete book in existence; it is now admitted to be a compilation from various sources; this is known from the double record of various events and from differences in style and language. According to Dr. Driver, the two earliest documents from which book was compiled are those known as J and E, from their respective use of the terms Jehovah and Elohim in speaking of the Creator; these two seem to have been combined by a third writer into a single story; they are not now easily distinguishable, and are generally referred to together as JE. The third principal source is generally known as P, or the Priests' Code; this in itself gives practically a complete story, and it is written with a certain precision which contrasts with the less studied style of the earlier sources; it is sometimes called the Elohistic narrative, from constant use of term Elohim. A later editor seems to have combined P with JE, using the former as a kind of groundwork into which he has introduced portions from the earlier documents.

GENESSEE RIVER. A stream that rises in Pennsylvania and flowing 200 miles through western New York empties into Lake Ontario. The Genessee is noted for its falls, Portage Fall, 100 feet high, taking the lead, and there are others 68 and 90 feet high. There is a fall of 95 feet above Rochester and a cascade below it nearly as high.

GENEVA (Fr. *Geneve*). (1) Canton, Switzerland (46° 15′ N., 6° 7′ E.); watchmaking and jewelry. Area, 108 sq. m.; pop. 1920, 171,000. (2) Tn., Switzerland (46° 12′ N., 6° 9′ E.), cap. of above Canton, at S. W. end of Lake Geneva, overlooked by Jura and Alps. Rhône, issuing from lake, flows through city under handsome bridges. Geneva is a great commercial, industrial, and educational center and favorite resort of foreigners; it has striking modern buildings, broad quays, and fine boulevards. Among the few older buildings of interest are the Cathedral of St. Pierre (12th and 13th centuries), Chapel of the Maccabees (15th cent.), town hall (15th cent.), arsenal containing historical museum; old tower (c. 1219) on the Ile in Rhône. Notable modern features are univ. (founded as academy in 1559 by Calvin; became univ. in 1873), Bâtiment Electoral, Conservatoire de Musique, Victoria Hall (concert hall), Theatre, Musée de Fol (fine collection of antiquities), Musée Rath (pictures and sculptures), Musée Ariana (art collection), Musée des Arts Décoratifs, statue to Duke of Brunswick (who left his fortune to Geneva), Rousseau Island, houses of Calvin and Rousseau, Quai du Mont Blanc with splendid view of Mont Blanc, Grand Quai du Lac, etc.; chief industries are watch making, jewelry, diamond cutting enameling, musical boxes, scientific instruments, and cutlery. Geneva first appears in Cæsar's *Gallic War*; held by Burgundians and Franks, 5th and 6th centuries; part of Ger. Empire (11th cent.); republic founded in 1512, allied to Swiss cantons in 1584; long resistance to house of Savoy ended successfully in 1603; annexed to France, 1798; admitted into Swiss Confederation in 1815. It is the headquarters of the League of Nations. In 1907, popular vote decreed separation of Church and State. Geneva figured very prominently in the Reformation; Farel, famous Prot. preacher, settled there in 1533, Calvin in 1536. The same year Geneva finally espoused Prot. faith; Farel and Calvin were exiled in 1538; latter, recalled in 1541, was for the rest of his life the stern and severe ruler of Geneva, even sending Gruet, 1547, and Servetus, 1553, to the stake. Pop. 1920, 135,059.

GENEVA, a city of New York, in Ontario co. It is on the New York Central and the Lehigh Valley railroads, and on Seneca Lake and the Seneca and Cayuga Canal. It has many important industrial plants. It is the seat of Hobart College, the Geneva Medical College and the State Agricultural Experiment Station. It has a public library and a high school. Pop. 1920, 14,648.

GENEVA BIBLE. See BIBLE.

GENEVA COLLEGE. A co-educational institution at Beaver Falls, Pennsylvania, founded in 1848 under the auspices of the Reformed Presbyterian Church. The college buildings are valued at over $250,000. It has a library of 5,000 volumes. Productive funds, $208,000; income about $28,000. In 1922-1923 the students registered were 631. Teachers, 16. Director, A. A. Johnston.

GENEVA CONVENTION, an agreement relating to treatment of sick and wounded in war, neutrality of ambulances and military hospitals together with their staffs, etc., was adopted at international conference at Geneva, 1864, which originated in a book entitled *Un Souvenir de Solferino*, by Henri Dunant, a Genevese philanthropist. Sympathy following publication of this book was crystallized by M. Gustave Moynier. Convention was accepted by every civilized nation. There have since been supplementary conventions. The New Geneva Convention, 1906, was signed by thirty-five nations. The Hague Convention, 1907, adopted terms of Geneva Convention for maritime warfare. The distinctive flag adopted by the Convention shows a red cross on a white ground, and is supposed to confer immunity on the establishments over which it flies, though during the World War it was frequently violated by the Germans. Hospital ships are painted white with green strake. Ships so distinguished were sunk by Ger. submarines.

GENEVA, LAKE OF, LAC LÉMAN (46° 25′ N., 6° 30′ E.), largest lake, ancient *Lacus Lemannus*, Switzerland, bordering Haute-Savoie, France, and cantons Geneva, Vaud, and Valais; extends in crescent shape E. to W.; traversed by Rhône; length, 45 miles; greatest breadth, 9 miles; height above sea-level, 1,230 ft.

GENEVIÈVE, a noble Brabantine lady who was falsely accused of wifely infidelity. The story is a common theme of mediæval romances.

GENEVIEVE, ST. (*c.* 422-512), guardian saint of Paris, which she protected against Attila and Huns; what is now the Panthéon was erected as a church in her honor; her tomb was desecrated at the Revolution.

GENGHIZ KHAN, Jenghiz Khan (*q.v.*).

GENITIVE CASE. See LATIN LANGUAGE.

GENIUS, beneficent spirit who, in the belief of the ancient Romans, presided over the birth and career of every human being. The Greeks called such spirits *daemones*.

GENNADIUS II, GEORGIOS SCHOLARIOS (*d. c.* 1468), patriarch of Constantinople; tried to unite Gk. and Lat. Christendom; a distinguished scholar.

GENNESARET, SEA OF. See GALILEE, SEA OF.

GENOA, OR GENOVA, strongly fort. seapt. and chief commercial city of Italy, on Gulf of Genoa (44° 24′ N., 8° 54′ E.). Its situation in midst of Riviera, its mediæval churches in black and white marble, 16th cent. palaces, steep irregular old lanes, and broad handsome modern streets justify its title, *La Superba*. The magnificent harbor has been greatly extended. Among finest churches (11th and 12th and later centuries) are Santa Maria di Castello, San Lorenzo Cathedral, San Donato, Santo Stefano, San Giorgio, San Matteo, San Siro, Santa Maria di Carignano, L'Annunziata, and Sant' Ambrogio. Outstanding palaces (with art treasures) are Rosso, Bianco, Doria, Municipale, Balbi-Senarega, San Giorgio, Reale, Durazzo-Pallavicini, and Ducale (the residence of the doges); univ. (founded in 1471), Art Academy (and Museo Chiossone), munic. library; Verdi Institute of Music; Teatro Carlo Felice; Porta Pilo, Lanterna, Romana (old gateways); Campo Santo (cemetery), beautiful parks and monuments. Chief industries are shipbuilding, silk and velvet, cabinet-making, filigree work, marbles, damask, lace, embroidery, candied fruit, leather, macaroni. In the Middle Ages Genoa's position made her the recognized leader in Liguria against Saracen and other invaders, and mistress of W. Mediterranean; republic of Genoa crushed Pisa, 13th cent., but was conquered by Venice in 1380. Family feuds continually disturbed Genoa; Doges installed, 14th cent.; embodied in Ligurian Republic, 1797; annexed to France, 1805, to Sardinia, 1815. Famous Genoese include Columbus, Admiral Andrea Doria and Mazzini. Pop. 300,000.

GENOVESI, ANTONIO (1712-69), Ital. philosopher; first entered the Church, then took to law, finally to philosophy; prof. at Naples.

GENSERIC, Gaiseric (*q.v.*).

GENSHIN (942-1017), Jap. artist; known also as Yeshin Sodzu; his *Descending Buddha* and similar studies are amongst the greatest religious pictures of the world.